

FLIGHT

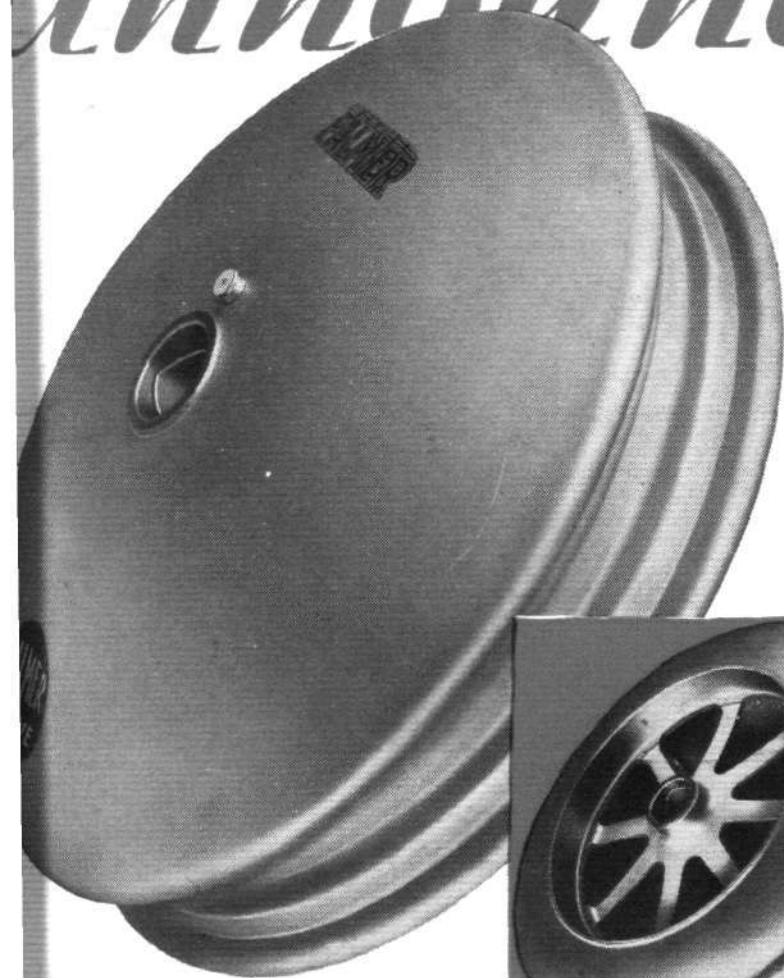
The
AIRCRAFT ENGINEER
AND AIRSHIPS

No. 1362
Vol. XXVII

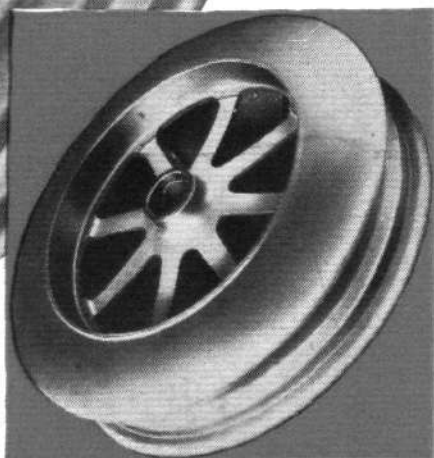
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tyres

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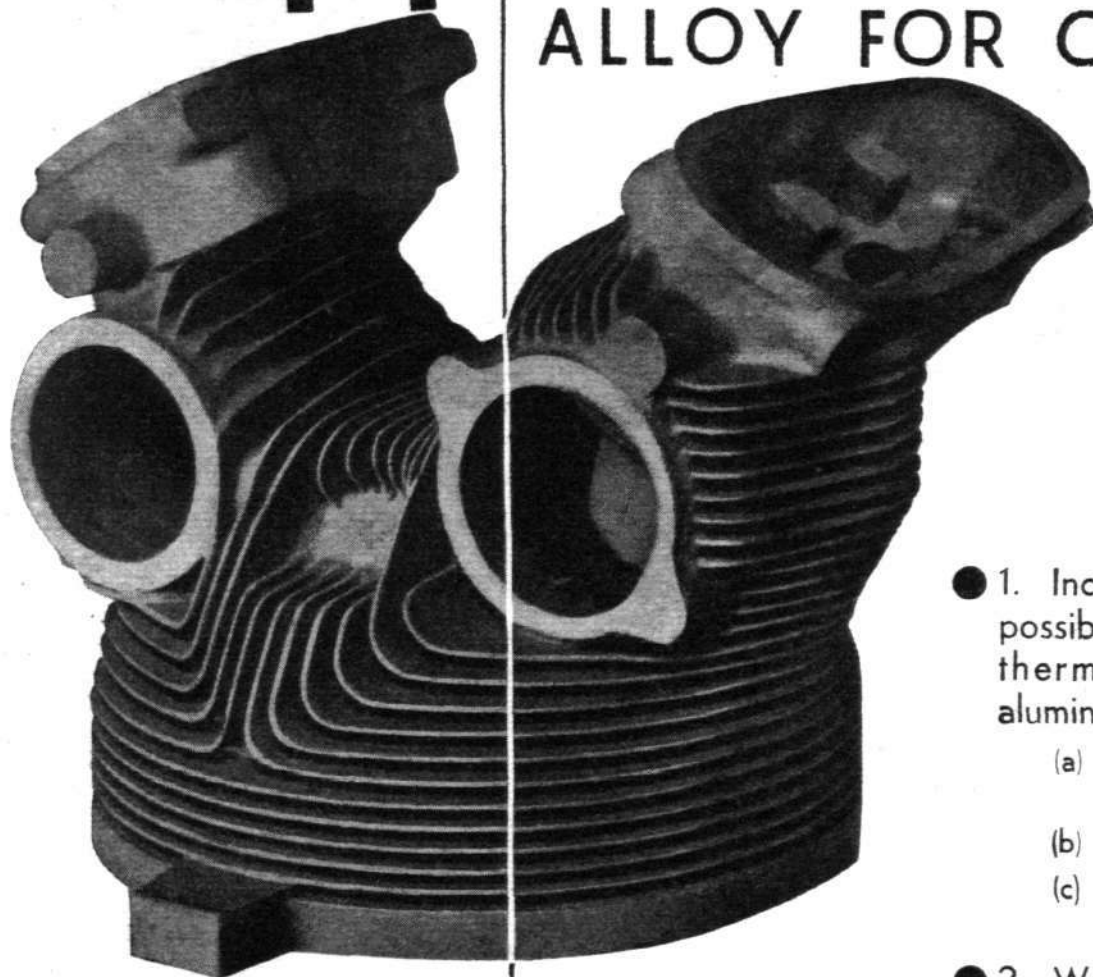
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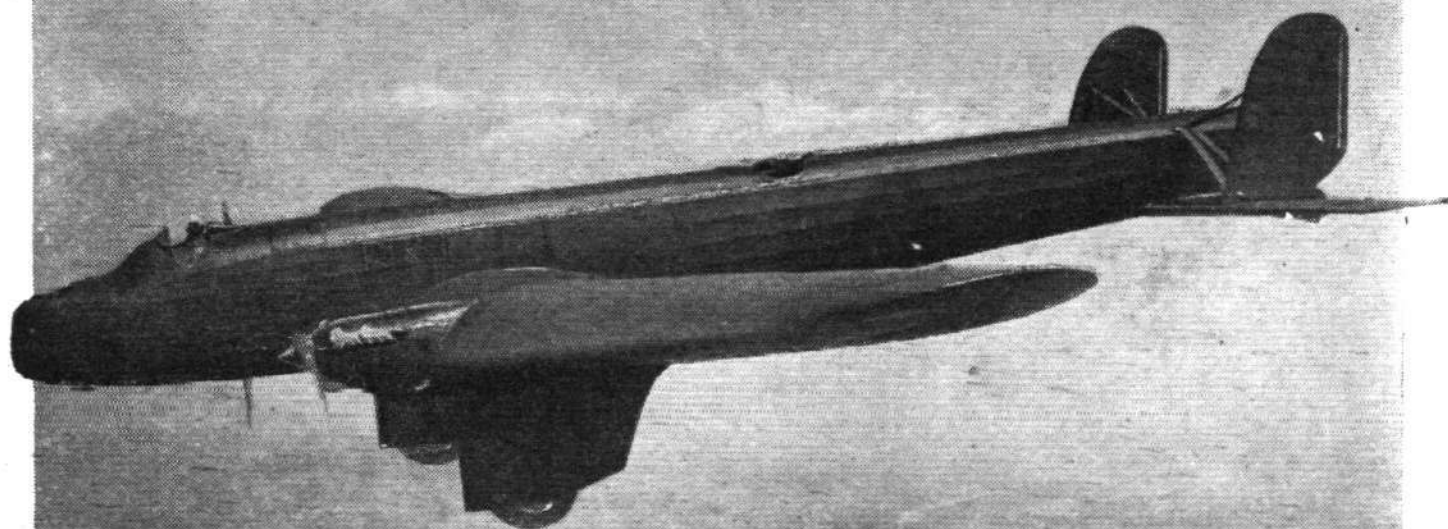
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Founded in 1909

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OFFICIAL ORGAN OF THE ROYAL AERO CLUB

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A.A.F. Increase Deferred

NO strong objection can be taken to the decision of the Air Ministry that the immediate expansion in air strength must be confined to the regular Air Force and the Reserve. *Flight* has always been a strong believer in the Auxiliary Air Force, because it gives as good value for money as any defensive body has ever given. The A.A.F. squadrons are very cheap and they are very good. Seldom, if ever, has unpaid voluntary work for the nation reached such a high pitch of efficiency. The desire of Territorial Association of the West Riding to raise an A.A.F. squadron is natural and commendable, and it would be a good thing if similar ambitions were manifested by other counties. It has always seemed somewhat of a mystery that Lancashire has never moved in this matter, considering the great flying enthusiasm in some of the cities of that shire. Nevertheless, at the present time the Air Ministry is right to concentrate on regular units and the Reserve which must go with them.

A Dubious Innovation

AUTHORITY under the Air Navigation (Consolidation) Order, Article 10, has been conferred by the Air Ministry upon Capt. V. H. Baker, the chief pilot of Airwork, Ltd., Heston, to see that occupants of aircraft using that aerodrome abide by a number of legal requirements. Everyone who knows him will feel sure that Capt. Baker will carry out his new duties extremely well, and we may congratulate the Air Ministry on having made a very good choice. It is a totally new step, presumably intended to save the expense of keeping a special Air Ministry official at Heston, where he would have very little to do.

It is only on a point of principle that we feel rather dubious about the wisdom of this innovation. How-

ever well it works—and we are sure it will work well in the case of Capt. Baker—it may set a precedent, and that precedent might some day, with quite different personnel engaged, give cause for complaint. The firm of Airwork does not merely own Heston airport; it also operates aircraft on occasion. It is surely not a right principle (however justifiable in this special case) that a person who is in charge of certain flying operations should hold power to restrict the operations of aircraft belonging to another, and possibly a rival, firm. It is a British principle that parties in a case should never be judges in that case, and to disregard that principle may some day give cause for complaint.

King's Cup Plans

SEPTEMBER is sometimes a lovely month, but the days are then beginning to grow shorter, and therefore it is hardly an ideal time of year for holding long air races in the British Isles. The Royal Aero Club has decided upon September 6 and 7 as the dates for the King's Cup race this year, and we must say that July is a better month for this event.

However, leaving the date out of the question, it is a wise decision of the club to send the racers over Scotland, Northern Ireland, and Wales. It is some years since even the North of England has had a chance to see the competitors in this great race, Scotland has been excluded for still longer, and to Ulstermen the racing aeroplanes will be an entirely novel spectacle. Ulster is proud of her Special Reserve R.A.F. Squadron, and will doubtless give the King's Cup racers a hearty welcome. When last the course included Scotland the only city visited was Glasgow. Since then active aerodromes have been opened at Edinburgh, Aberdeen and Inverness, though it remains to be seen whether all of them will be included in the course. There are not too many forced landing grounds between Inverness and Belfast, though commercial air companies have actually done a good deal of flying over the Highlands.

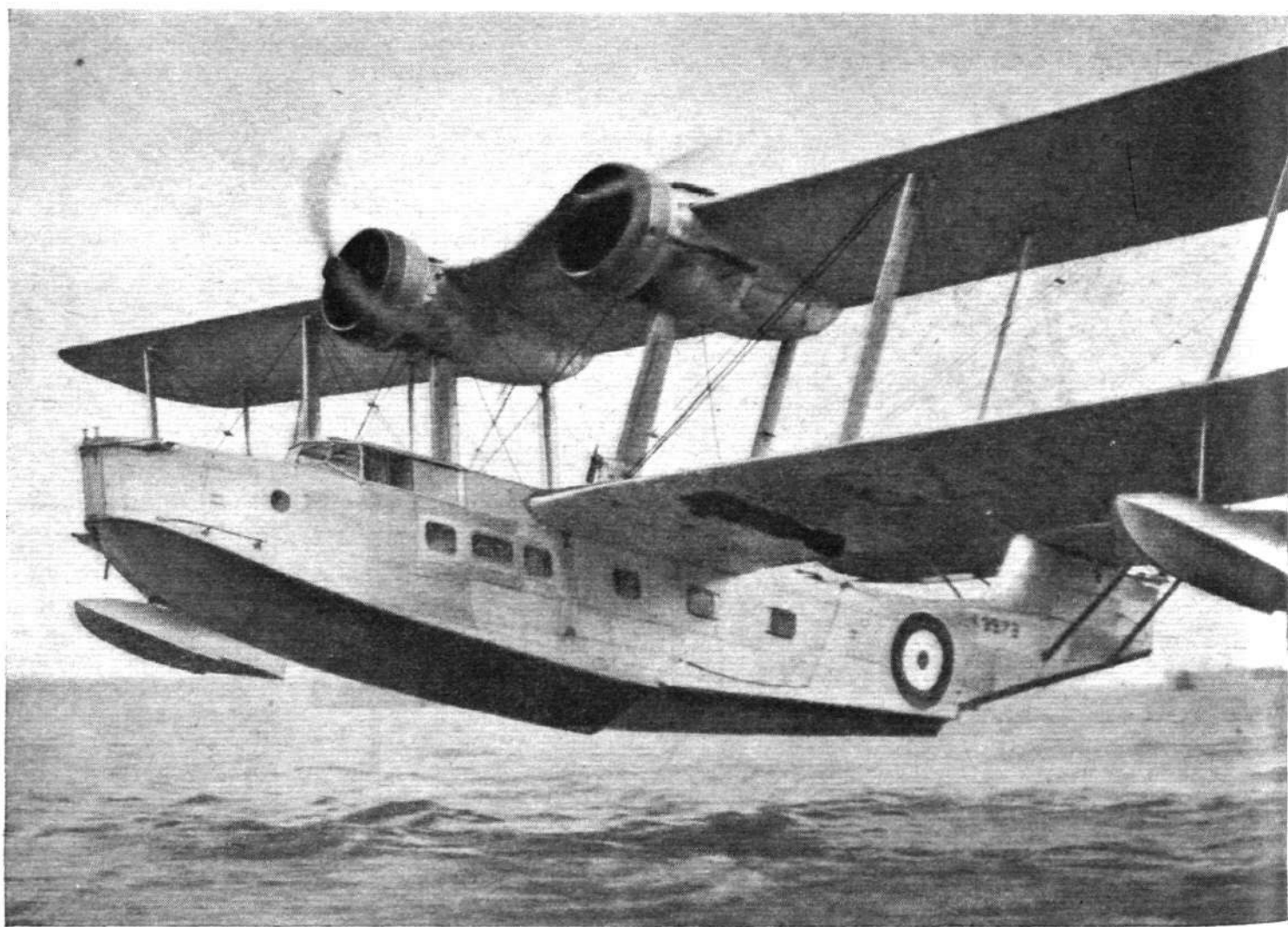
London is the only city which has never displayed any great desire to see the start and finish of a King's Cup race, and therefore we hold that the wisest policy would be to exclude London altogether from this course. It would save everyone the humiliation of seeing the greatest civil flying event of the year performed before (so to speak) empty benches. An arrangement was made by the Royal Aero Club by which the race is obliged to start from and end at Hatfield this year if the De Havilland Company so desires, but it is not yet certain whether the company will insist on its rights.

The Gliding Situation

AN extraordinary general meeting of the British Gliding Association is to be held on Saturday next, when the lately framed rules for reconstituting the Association will come up for ratification or rejection. The most important rule to be discussed is that no club shall be eligible for affiliation to the B.G.A. unless it has at least twenty-five full flying members at a subscription of not less than £2 per annum. This rule was framed at the suggestion of the Air Ministry, which has announced its readiness to subsidise gliding to the extent of £5,000 per annum for five years, but has stipulated that all must first be well with the gliding movement. As the London Gliding

Club, which is the most active and influential of the gliding clubs, has given up its affiliation with the B.G.A., it is evident that recently all has not been well inside the movement. Another symptom is the tendering of his resignation by the honorary secretary, Mr. Howard Flanders.

When the B.G.A. has been reconstituted, as we assume that it will be, it will discuss with the Air Ministry the best way in which the subsidy is to be distributed. So long ago as June 14, 1934, before the grant of the subsidy was announced, *Flight* expressed in a leading article the view that there would be very little national profit in doling out money to enable individuals to gain gliding certificates. It was suggested in that article that to endow a centre, where there would be collected all available knowledge and experience, aerodynamical, meteorological and aeronautical, for the benefit of all gliding clubs, and where gliding instructors could be trained, would be the best purpose to which the subsidy money could be put; while at the same time it would be a very good thing to help clubs to buy their own gliding grounds, and to keep them clear of power cables and pylons. In certain centres the gliding clubs are full of vigour and initiative, and have contrived to carry on so far without any State aid. That some form of State aid is now desirable we quite agree, but it is the gliding movement in general, rather than the individual aspirant for a certificate, which is in need of help.



HIGH-SPEED SERVICE DEVELOPMENT: In a leading article last week *Flight* called attention to the threat to British commercial flying boat supremacy. On the Service side progress is steadier, and the new Vickers-Supermarine flying boat (Bristol "Pegasus" engines), shown in this remarkable photograph, is one of several types now undergoing trials. Another photograph will be found on p. 127.

The Outlook

A Running Commentary on Air Topics

Another International Race

REPORTS from Washington state that another international air race is under consideration. If the necessary financial backing can be obtained, it is proposed to make the course from Washington to Buenos Aires and back, 18,000 miles. The route provisionally suggested is down the Atlantic coast of North America and down the Pacific coast of South America, crossing the Andes to Buenos Aires, and returning *via* Rio de Janeiro, Mexico, and Los Angeles to Washington. The proposed prize money is to be between £20,000 and £30,000, and the date is October or November of the present year, when the Antipodes have been nicely warmed up.

Evidently our American cousins have realised the good done by the MacRobertson race from England to Australia, and intend to go one better. This sincerest of all forms of flattery should be very gratifying to Sir Macpherson Robertson and all who had to do with the great race of last year. But—designing new aeroplanes for this race will cause some slide rules to run red-hot!

Aerodrome Classification

MUNICIPAL authorities and others considering the establishment of an aerodrome will be glad to secure a copy of Air Ministry pamphlet No. 55. It is a publication which not only gives, in a particularly clear and concise manner, the requirements of an aerodrome, but also explains the classification scheme which has been officially adopted.

In future, by means of this scheme, it will at sight be possible to know exactly the type of an aerodrome and its facilities. For example, an aerodrome classified as "A I a" is one which has effective runways of 800 yards or more in length and 200 yards or more in width for all wind directions, is fully provided with every form of general equipment from hangars to medical requirements, and has every facility for night landing. The first letter is an intimation of the general classification, the Roman numeral of the general facilities, and the small letter shows the class of night-landing equipment.

Other information in the pamphlet is a schedule of the requirements governing the issue and renewal of aerodrome licences.

Air Tours

JUDGING from the partly completed plans of a number of charter firms, short and long air tours are likely to be quite popular this summer. Certainly, it would be difficult to imagine a more pleasant way of seeing either this country or the Continent. Flying allows a maximum period for sightseeing on *terra firma* and a minimum period of travelling, while the latter itself is considerably more enjoyable and useful than that carried out in surface conveyances.

Parties can be small enough for all the members to be in agreement over the itinerary; yet if every seat, for instance, of a "Dragon" is filled, the rates can be low enough to compete with boats, trains or coaches, while leaving the operator an ample margin of profit. Furthermore, both the tourist and the operator can plan ahead and know exactly how much a certain trip will cost in hard cash. An English tour, incidentally, might suitably conclude with a night flight over London.

Variable View

ANYONE who has flown a machine in which the seat height is immediately adjustable, will thereafter be uncomfortable without such a device. In the average training biplane, with its far-from-perfect view, even a plain safety belt restricts movement to some slight extent and a Sutton harness, if tight enough to cope with excessive "bumpiness" or with sloppy aerobatics, will, while giving ample freedom for ordinary purposes, definitely prevent any upward movement which the pilot may need to make in an emergency.

The only alternative is to pack air cushions so that one can see perfectly in all directions—and so that one almost dies of exposure at a wintry four thousand or so. Every pilot should, in a cockpit, have six inches of varying seat height, any position of which can be obtained instantly without using the stick hand.

A Monetary Need

ONE of the most pressing needs in air touring is a system whereby local currency can be obtained in amounts of small denomination. Even with the comparatively low cruising speeds of aeroplanes of the kind which are commonly used by private owners and business men who run their own machines, it is easily possible to cross three or even more countries in the course of a day's journey. On a long trip no one wishes to be encumbered with a large and easily lost or stolen wad of, say, £1 or 10s. notes.

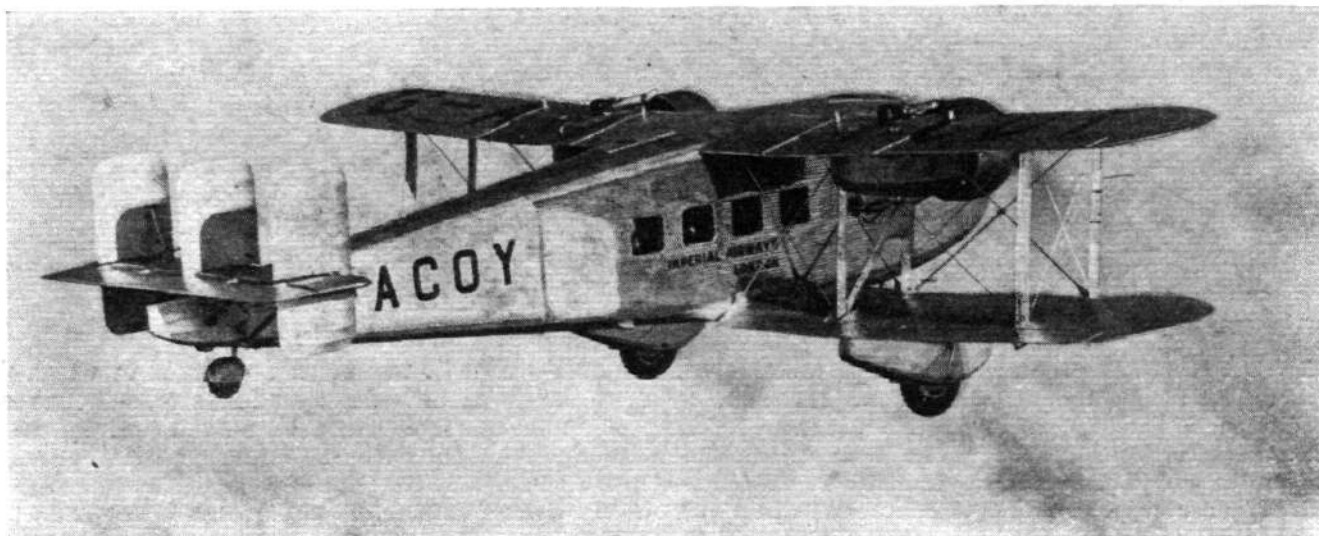
A World-Wide Letter of Credit enables small amounts to be obtained, but it has the great disadvantage, from the flying point of view, that cash can only be obtained from certain banks or agencies which, for the most part, are only open during normal business hours. Travellers' Cheques are convenient in that they can be cashed at most of the leading hotels, and on this score alone are probably better suited to the needs of air travellers than any other system of carrying money, but they can be obtained only in units of £5. This means that where, as is often the case, only one meal has to be paid for in a particular country, the wretched traveller very soon becomes encumbered with a large amount of varied foreign currencies, which can be exchanged only at a loss.

Suggested Solution

A SOLUTION would seem to be Travellers' Cheques in ten-shilling or one-pound units, which could be cashed not only at banks but also at leading hotels. The bank which has the courage to be first in this field to cater for the needs of the air traveller—who may soon be crossing countries faster than the motorist crosses counties—will reap a very nice little reward for itself.

Travellers' Cheques are not ideal, but they do offer a means of carrying money in a less readily negotiable form than bank notes, as they have to be signed in the presence of the cashier and this is, at least, a deterrent to petty pilfering.

Imperial Airways have already realised the need described in these notes and have instituted a scheme whereby their own passengers can purchase books of coupons of small denomination which can be cashed at their recognised stopping places; it should not be impossible for some world-wide travel organisation to issue coupons or cheques on a somewhat similar basis.



IMPERIAL AIRWAYS' LATEST

A New Type for Feeder-line Work : The Boulton Paul P.71A, which Follows the General Lines of the "Mailplane"

KNOWN in the makers' works at Norwich as the P.71A, this new Boulton Paul production has been especially built to the order of Imperial Airways, and two of the type are shortly being delivered for feeder-line work, where a high cruising speed, comfort for the passengers, a quick take-off and short landing are required. When compared with that of other modern transport aeroplanes the performance of the P.71A is not particularly startling, but in this connection it should be remembered that it has been built to Imperial Airways' own specification and must be assumed to have the performance they require.

Basically, the P.71A machine springs from the "Mailplane," details of which were published in *Flight* for April 6, 1933. There are, however, several structural differences which make it most interesting from an engineering point of view. As with the "Mailplane," it is a two-bay biplane with two engines mounted high up between the wings directly above the widely spread wheels of the undercarriage. The engines, which are two Armstrong Siddeley "Jaguar VIA's" from Imperial Airways' stock, are mounted on built-up duralumin ring-type mountings slung from the underside of the top planes by steel tubes and built-up girders, and cowed with Townsend ring-form cowlings. These mountings coincide with the inner interplane struts and the points at which each separate half of the undercarriage is attached beneath the lower planes.

The sketches explain the construction of the undercarriage, and from the photographs it can be seen how neatly each half is faired in. The Dunlop wheels, which have Dunlop brakes, are carried between oleo-pneumatic shock-

absorbing legs. The fairings are detachable and are fabric covered structures of spruce, light stringers being bent round formers to carry the fabric. This system of building up fairings has been used for a number of other places on the machine, notably under and above the fuselage between the wings, and round the nose of the fuselage, their detachability being a useful feature.

Fuel is carried in four riveted-duralumin tanks. Two, having a capacity of 65 gallons each, are placed one on each side of the fuselage in the roots of the top-wing centre-section; the other two, of 28 gallons each, are mounted one on each side in the top wing sections outside the engines. The lubricating-oil tanks are of the same construction and form part of the leading edge of the top planes above each engine.

No hard-and-fast rule has been adhered to with regard to the material used for construction in the P.71A. In many places light alloy is used extensively, while in others, where the stresses are high, steel has been used. Even the form of construction has been varied considerably. The front end of the fuselage, where it forms the pilot's cockpit, consists mainly of duralumin tubes secured at the joints either by flattening the tube ends and riveting them between fitch plates, or by using machined fittings. The rear half of the fuselage—that is, abaft the passenger cabin and luggage compartment—is also built up in the same manner with duralumin tubes bracing steel longerons, but is covered with doped fabric stretched over spruce formers and stringers.

The centre portion of the fuselage is entirely different in construction. Its general form is somewhat analogous to flying-boat-building practice, that is to say, the main structure is formed of built-up

BOULTON PAUL "P71A"

TWO SIDDELEY "JAGUAR VIA" ENGINES.

| | DIMENSIONS. | ft. | in. | m |
|-------------------|-------------|------|------|---------|
| Span of wing, top | ... | 54 | 0 | (16.45) |
| Height overall | ... | 15 | 2½ | (4.57) |
| Length overall | ... | 44 | 2 | (13.46) |
| Mean chord | ... | 6 | 10 | (2.08) |
| Aspect ratio | ... | 7.91 | | |
| | | | deg. | |

| | | | | |
|-----------|-----|-----------------|--|--|
| Dihedral | ... | 3.5, outer bays | | |
| Sweepback | ... | 2.86 | | |

| | AREAS. | sq. ft. | m² |
|---------------------------|--------|---------|---------|
| Main planes with ailerons | ... | 718.5 | (66.75) |
| Ailerons, total | ... | 76.0 | (7.06) |
| Tail plane | ... | 45.5 | (4.23) |
| Elevators | ... | 34.7 | (3.22) |
| Fin | ... | 12.7 | (1.17) |
| Rudder, total | ... | 40.5 | (3.76) |

| | WEIGHTS. | lb. | kg |
|---------------------------------|----------|-------|-----------|
| Tare weight | ... | 6,100 | (2 766.9) |
| Pay load | ... | 1,510 | (684.9) |
| Crew (two) | ... | 360 | (163.3) |
| Fuel and oil, normal | ... | 1,080 | (489.9) |
| Cabin equipment, wireless, etc. | ... | 450 | (204.1) |
| Max. permissible | ... | 9,500 | (4 309.1) |

LOADINGS AND RATIOS.

| | |
|--------------------------------------|--------------------------------|
| Wing loading | 13.25 lb./sq. ft. (64.6 kg/m²) |
| Power loading | 11.17 lb./h.p. (5 kg/h.p.) |
| Ratio of gross weight to tare weight | 1.56 |

PERFORMANCE.

| | |
|----------------------------------|---|
| Stalling speed, full load | 62 m.p.h. (99.7 km/h) |
| Cruising speed | 150 m.p.h. (241.4 km/h) at 4,500 ft. (1 371.6 m) |
| Take-off run, no wind, full load | 200 yd. (182.9 m) |
| Landing-run, no wind, full load | 200 yd. (182.9 m) |
| Service ceiling | 21,000 ft. (6 400.8 m) |
| Service ceiling on one engine | 4,500 ft. (1 371.6 m) |
| Rate of climb, sea level | 1,400 ft./min. (7.11 m/sec) |
| Climb to | 4,500 ft. (1 371.6 m), 4.5 min. |
| Range, normal | 420 miles (675.9 km) |
| Range, full tanks | 600 miles (965.6 km) |

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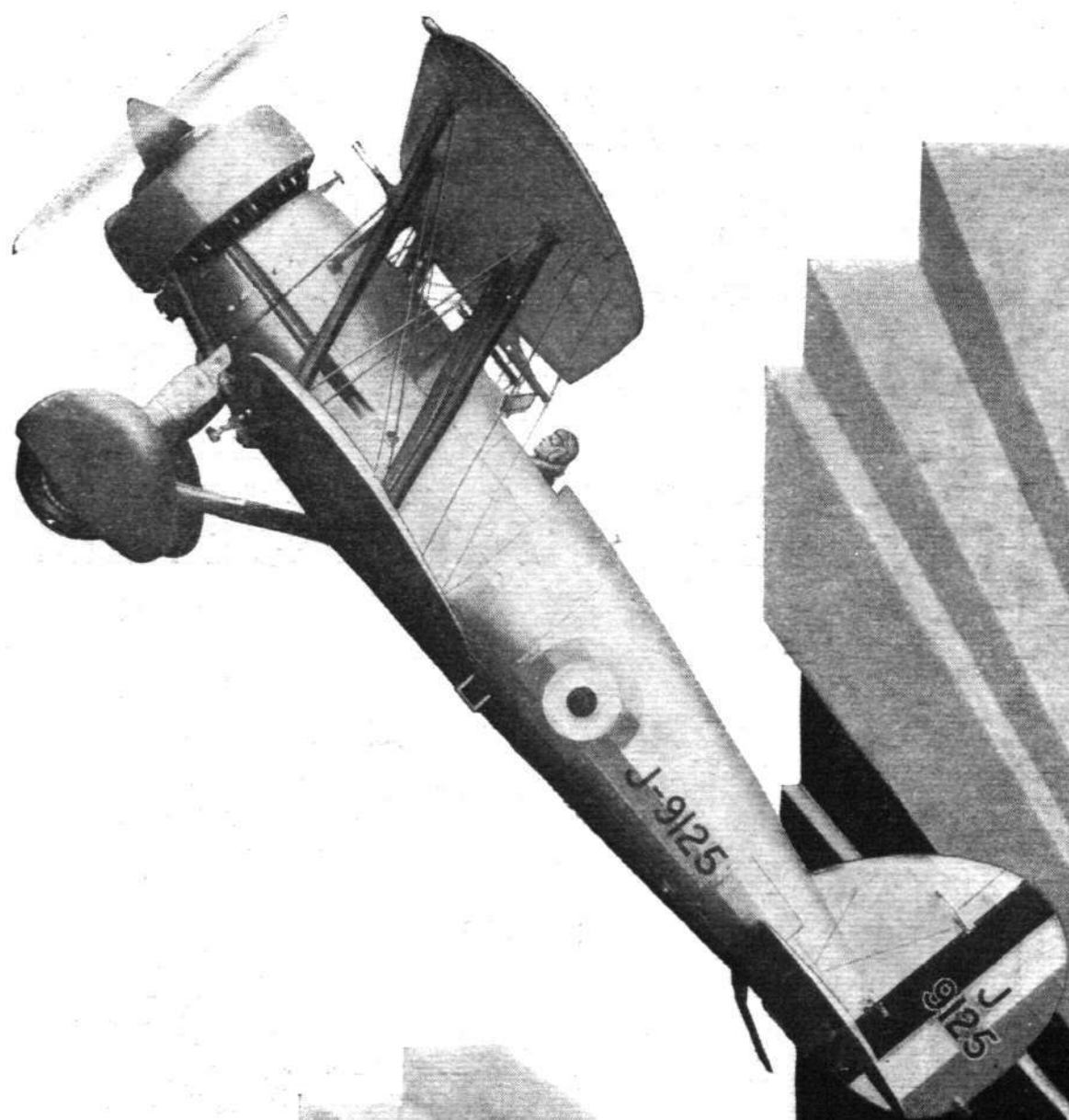


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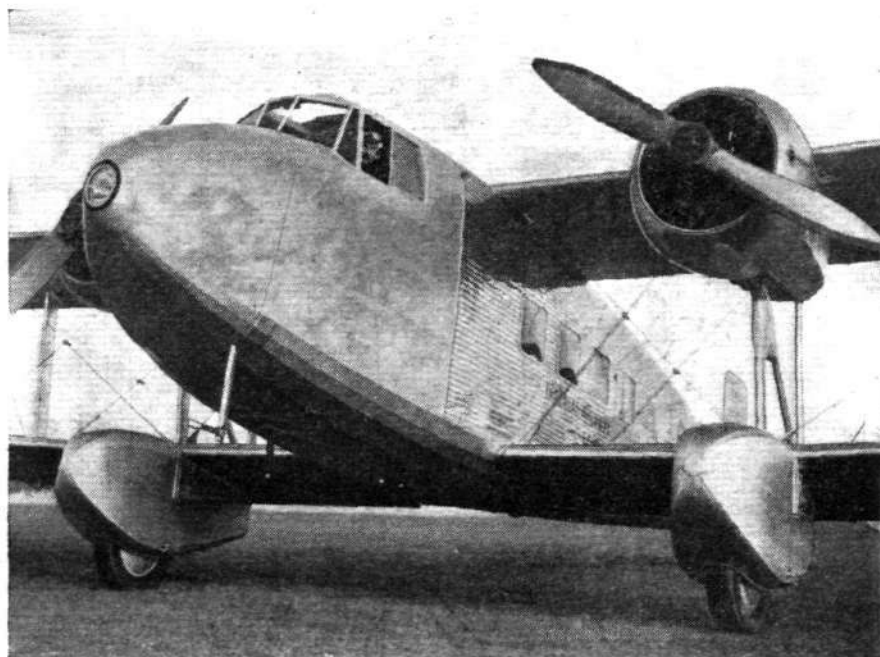
GLOSTER

"GAUNTLET"

ADOPTED BY ■
BRITISH AIR MINISTRY ■

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This view shows that the pilot has an excellent outlook forward. (*Flight* photograph.)



channel section duralumin girders over which is riveted a corrugated Alclad sheet covering. This centre portion forms the passenger cabin, with accommodation for a maximum of fourteen passengers. At the front end of the cabin, just behind a bulkhead which separates it from the pilot's cockpit—access to which is by a large door, and which, incidentally, has a "sunshine" roof made to slide open easily—there is a well-fitted lavatory.

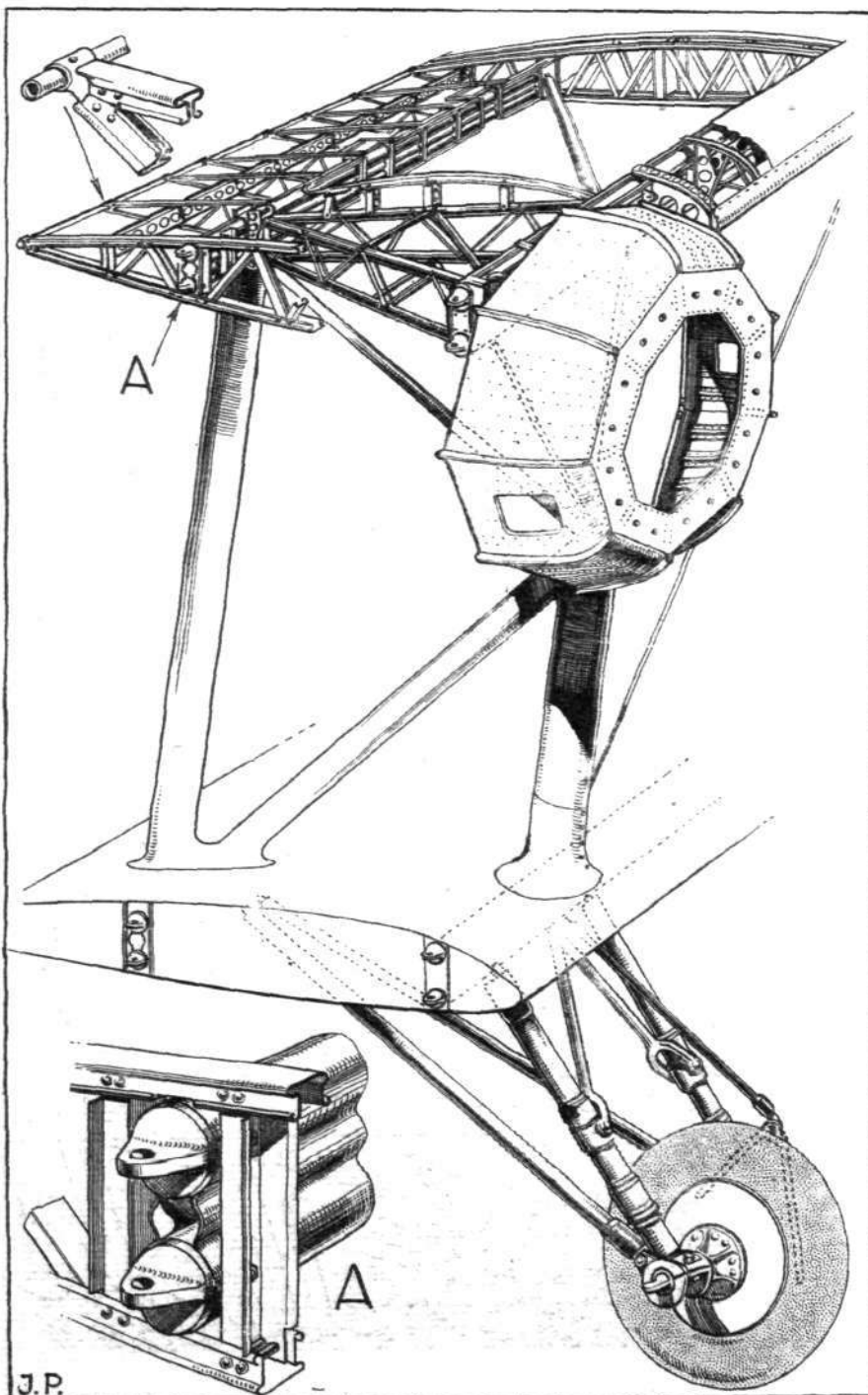
Particular attention has been paid to the comfort provided for the passengers. The cabin ventilation is on the "total" system, that is to say, warm or cold air is introduced through a large single inlet and exhausted in the same manner, the system being so arranged that all the air in the cabin is changed continuously. Rumbold's, who have established themselves as upholsterers to the aircraft trade, have looked after all the furniture and fittings in the cabin, as well as the sound-proofing, which is achieved in part by a padding of "Sepak" in the space—the depth of the structural girders—left of necessity between the outer Alclad shell and the inner lining.

A point of interest is the system adopted for operation of the controls. From the pilot's cockpit to the controllable surfaces there are, for the most part, tie rods; where it is necessary to carry them round corners they are connected to chains running over sprockets. Numbers of inspection doors are provided, while the detachable fairing around the cockpit makes inspection of the whole system a simple matter. A locking device secures the controls when on the ground, and prevents damage due to flapping in the wind.

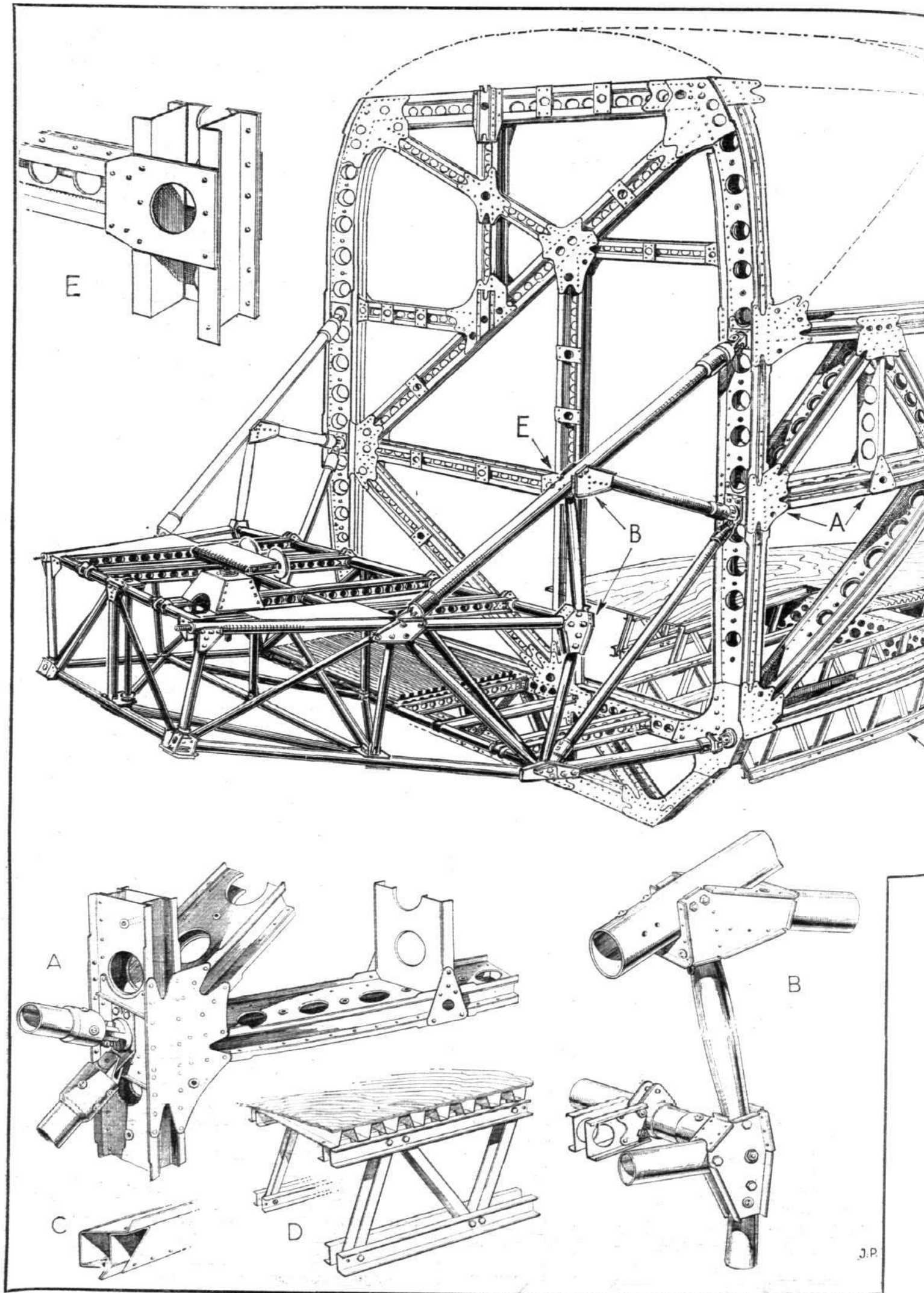
The tail units are unusual. The tail plane is a monoplane with a built-up duralumin spar and ribs of the same material, and is adjustable for trim by a screw gear. It carries a single central fin, also of metal construction, and two rudders. These latter are placed well towards the ends of the tail plane spar, one on each side of the fin. Rudder posts project above and below the spar and operate top and bottom rudder surfaces. The Dowty tail wheel is of the streamlined and self-centring type—a small point which is often overlooked but which saves quite a considerable drag when, as in the P.71A, cruising speeds of 150 m.p.h. are attained.

From an engineering point of view the P.71A is extremely interesting; the way in which different materials are used according to the work they have to perform shows that much thought has been put into producing a sound structure. The ratio of gross weight to tare weight is 1.56, a good average figure, probably sufficient to make the P.71A a sound commercial proposition for the work for which it is required, but scarcely high enough to allow it to be used really economically over long distances.

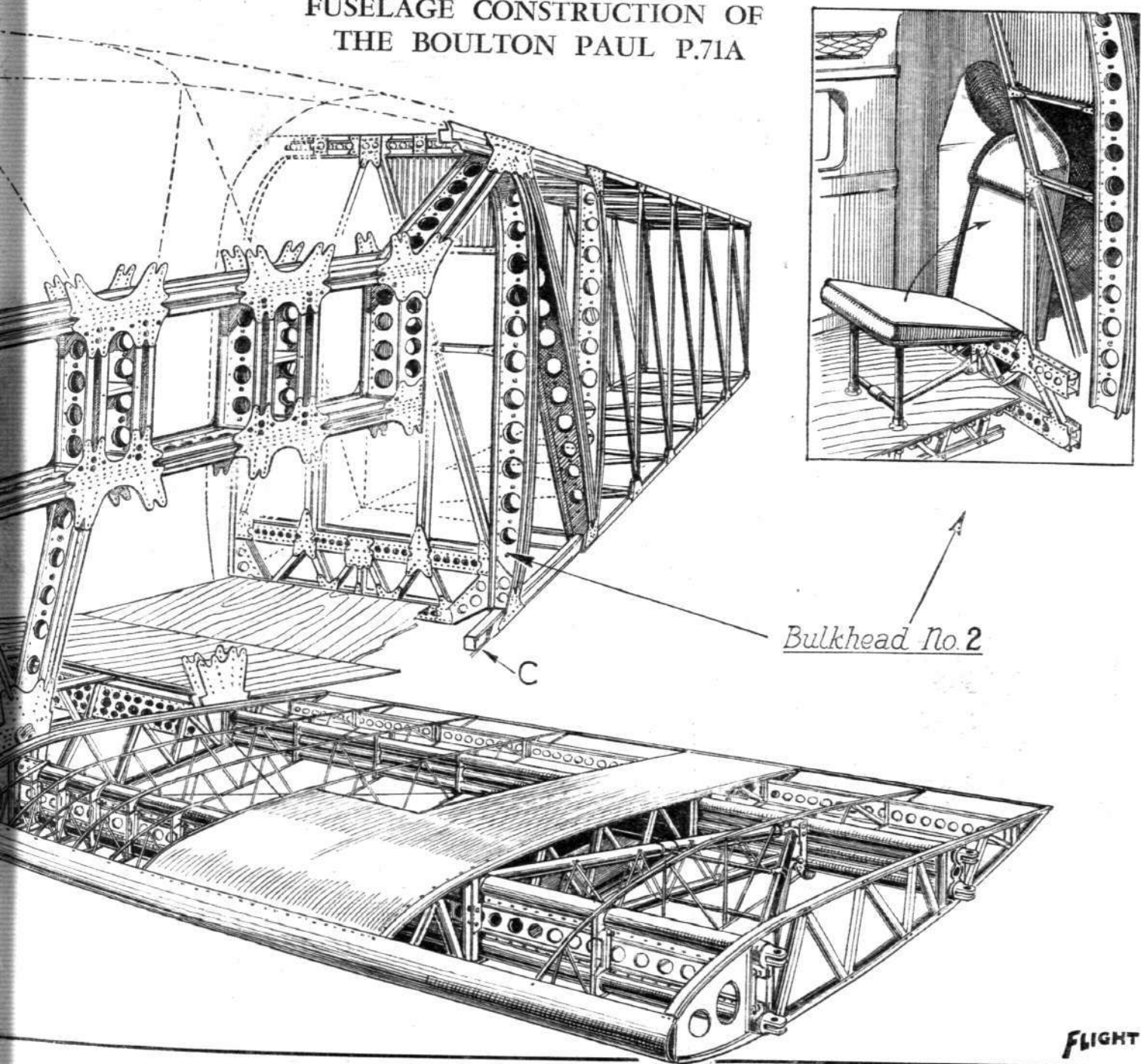
One of its more attractive features is its performance on one engine; a ceiling of



On the right are shown structural details of the engine mounting and undercarriage.



FUSELAGE CONSTRUCTION OF THE BOULTON PAUL P.71A

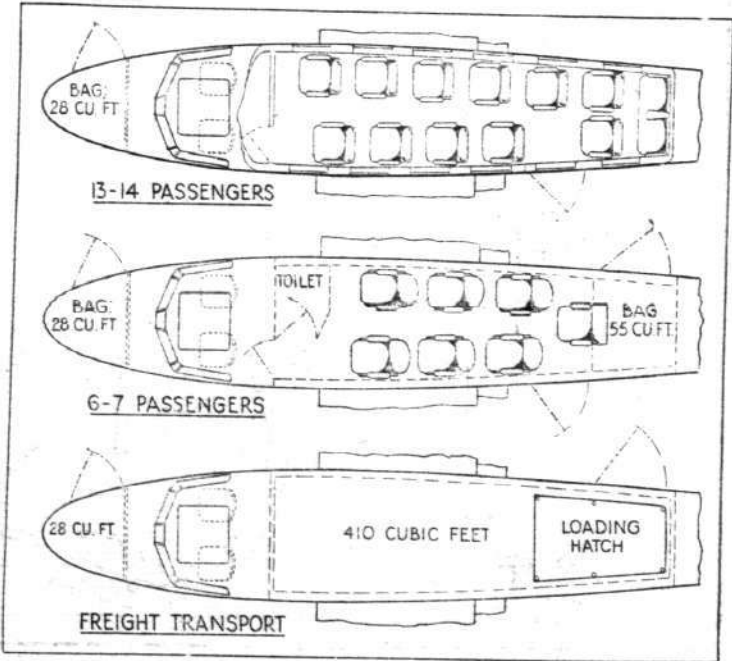


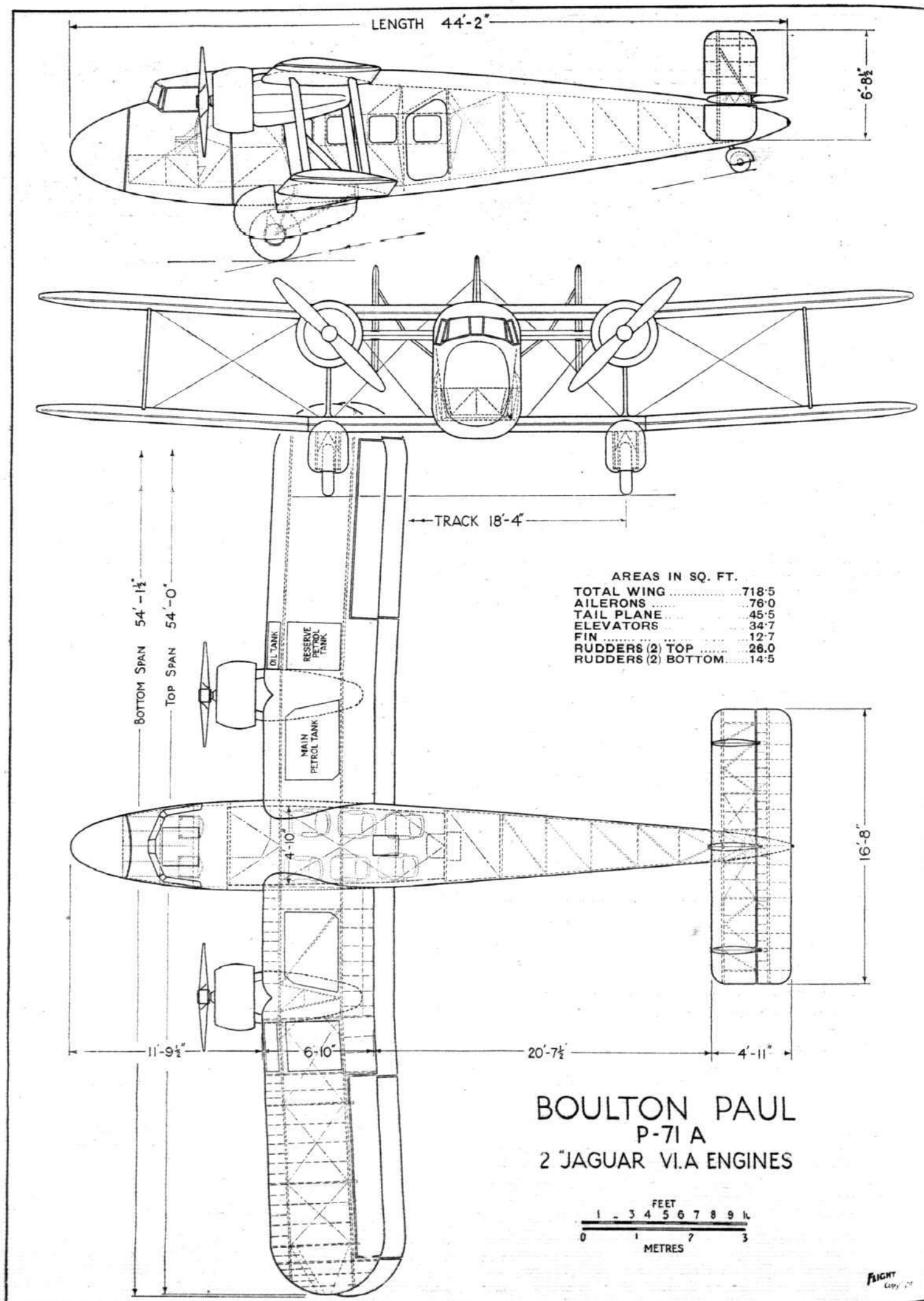
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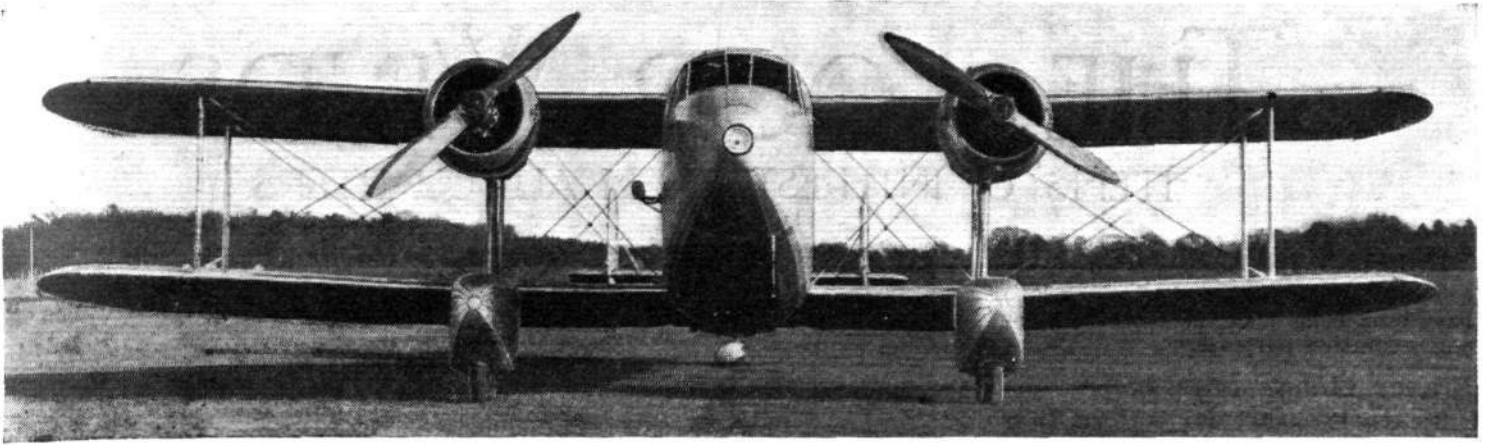
A structural sketch of the fuselage and bottom wing root of the Boulton Paul P.71A, showing the various methods of construction. The enlargements explain the construction at certain specific points indicated by letters. The centre portion of the main structure is covered with a corrugated Alclad skin and the after portion with doped fabric.

On the right is a diagram of three suggested cabin layouts.

4,500 ft. (1,372 m) is claimed on either engine. The comparatively low wing loading—only 13.25 lb./sq. ft. (64.7 kg/m²)—and low power loading of about 11.17 lb./h.p. (5 kg/h.p.) should ensure a good performance on aerodromes which are situated at a high altitude and in countries where the heat affects the performance adversely; it would seem probable that it is for conditions of this nature that Imperial Airways have made these two latest additions to their fleet. Certainly, for overseas conditions particularly, where the aerodromes are soft or where the run available for taking off is short, a machine which takes off with full load in 200 yd. (183 m) and lands in the same distance should be a blessing and a joy to the pilots, as well as a saving from the point of view of aerodrome costs.







Head-on, the Boulton Paul feeder-line machine is very clean indeed, despite the fact that it is a biplane. An engine-driven electrical generator would make it even cleaner. (*Flight* photograph.)

Both the *Britomart* and *Boadicea*, as the first two machines of this type will be called when flying the Imperial Airways flag, are fitted to carry six or seven passengers in great comfort. With the cabin accommodation limited to this number there will be a superabundance of leg room, considerable space for luggage and perhaps mails, and ample load left for very complete wireless, navigational, blind-flying and night-flying equipment.

Other schemes can, of course, be arranged to suit individual requirements. For example, our diagram shows a layout which provides for fourteen passengers. In this form the P.71A would be very suitable for short-distance shuttle services between two towns which normally want good transport connection but which are separated by bad country or by water. Where there is no need to provide for passengers at all the complete cabin can be left clear for freight, and then there is a space of no less than 410 cu. ft. (11.6 m³) into which freight can be loaded.

The New "Falcon"

The Miles "Falcon" ("Gipsy Major"), of which the latest particulars were given in *Flight* of January 10, has now made quite a number of test flights. In the hands of Mr. Miles, last Sunday, the machine appeared to promise a performance which should be exactly what the private owner of a cabin aeroplane wants. The top speed was high—Mr. Miles says that the cruising speed should be better than 120 m.p.h.—and the landing speed was very low. With the flaps down the glide was very steep indeed, and the owner-pilot should find no difficulty in getting the "Falcon" in and out of small fields. The latest development is the fitting of hydraulic operating gear to the flaps; this is being experimented with preparatory to deciding upon the production form it shall take.

London Gliding Club's Progress

THAT every pilot would benefit greatly if he or she had soaring experience in sailplanes is a view held by many. In this manner a knowledge of meteorology can be obtained which is of great value when flying power-driven aircraft. The London Gliding Club probably does more soaring than any other gliding organisation, as is shown by the fact that during the past year members flew 420 hours 45 minutes, excluding all instructional flying and flights of less than five minutes' duration.

The annual review of the club's work has just been issued—a most creditable piece of work which is packed with information. Taking points as they occur, we learn that there have been seventeen cross-country flights, covering a total of 518 miles, as compared with one flight of 28 miles in 1933. A plea is made for greater co-operation from meteorologists; we should have thought that "met." experts would have been only too ready to make use of soaring flight to enlarge their knowledge. Through the generosity of Lord Wakefield and Mr. E. Hardwick, the club have been able to purchase their gliding ground at Dunstable. The membership is now 230.

An interesting point about the machine as a whole is the family resemblance it bears to the military machines made by the same firm, notably the "Overstrand." Designers who produce fast civil machines generally do so *ab initio*, as it were, and it is not very often that we see a civil machine, particularly a biplane, wherein the performance has largely been secured by utilising the lessons learnt in military aircraft following a somewhat similar layout.

Boulton Paul have their own wind tunnel, and, therefore, are in a position to design in the light of their own basic investigations, so that, despite the fact that a biplane probably offers more possibilities of aerodynamic interference between the component parts than does a monoplane, they have been able to produce, in the "Overstrand" type, a machine comparing more than favourably with aircraft which rely on but one wing for their support in the air.

Ninety-two Royal Aero Club gliding certificates were obtained in 1934, and London club members hold 72 per cent. of the total certificates issued. The club owns four glider and six sailplanes, and there are, in addition, at Dunstable seventeen sailplanes owned privately by members. The whole of the existing club premises are to be pulled down and rebuilt at an early date.

The latter part of the review contains much valuable information about the sailplanes and gliders in general use in this country, statistics and photographs making this section an admirable one for reference. The address of the club secretary, from whom details as to membership can be obtained, is 13, Victoria Street, London, S.W.1 (Victoria 9153).

The Big Monospar

Further details of the new "Monospar" S.T.18 have been announced by General Aircraft, Ltd. This machine, as we stated last week, is being built to carry ten passengers and a crew of two, and will have two Siddeley "Serval" engines, or engines of a similar horse-power. It is said that it will have a speed of 208 m.p.h.

Employing the Monospar system of wing construction, the machine will show an all-up weight of 860lb. per passenger; the range will be 600 miles with normal tankage, and the cost £8,000. Retractable undercarriage, controllable-pitch airscrews, and wing flaps will be used. Orders for the type have been placed by Oceanic Airways, Ltd., of Australasia. It is claimed that the S.T.18 will climb with full load on one engine.

R.A.F. Benevolent Fund

The usual meeting of the Grants Committee of the above Fund was held at Iddesleigh House on Thursday, January 24. Mr. W. S. Field was in the chair, and the other member of the committee present was Mrs. L. M. K. Pratt Barlow, O.B.E. The committee considered a number of cases and made grants to the amount of £659 11s. 6d. The next meeting was fixed for February 5.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

"Douglii" for U.S. Navy

Three Douglas D.C.2's ("Cyclone F") have been bought by the U.S. Navy for administrative purposes.

France Orders Farmans

Sixteen Farman F.221 bombers (four 800 h.p. Gnome Rhone "Mistral Majors") have been ordered by the French Armée de l'Air.

S.O.S.

The U.S. Navy Department is getting concerned with the frequency of S.O.S. calls from the air, and is asking for powers from Congress to prohibit trans-ocean flying, between American territories by individuals in search of fame or records.

German Girl Pilot Home

Fraulein Elli Beinhorn, who has been making a flying tour in South America, arrived back in Hamburg, in the s.s. *New York*, on January 18, and was given an official reception by the Berlin Aero Club on January 27.

Paris-Madagascar in Three Days

Three French airmen, MM. Genin, Laurent, and Robert, have just accomplished a flight from Paris to Madagascar, a distance of 4,400 miles, in 3 days 13 hr. 18 min. They were flying a Farman 199 monoplane (300 h.p. Lorraine "Algol"), and used Shell fuel and oil.

Mrs. Keith Miller

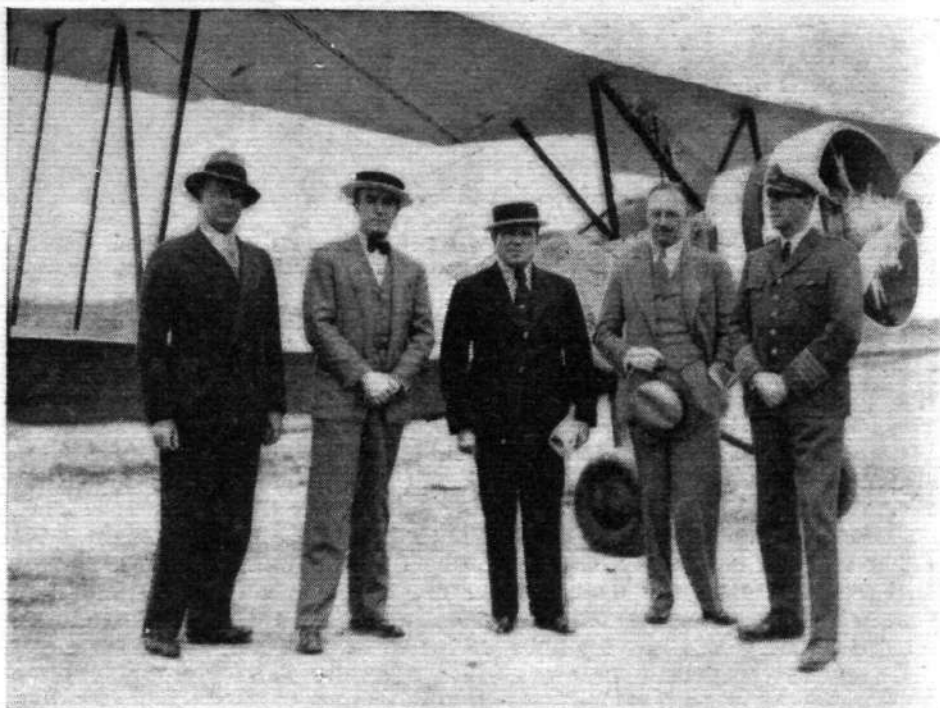
Mrs. Keith Miller, who left Croydon on January 4 in a Redwing biplane on a business flight to the Cape, reached Gao on January 24, having crossed the Sahara in company with the Trans-Saharan Co.'s mailplane. She arrived at Niamey the following day and then left for Duala.

Golden Rain!

At the time of going to press there is no news of the recovery of the consignment of gold, said to be worth £22,000, which fell out of a Hillman machine during a bumpy trip from Paris to Abridge last Saturday. The pilot, Mr. J. Kirton, could not say whether the loss occurred over land or sea. A suitcase belonging to one of the passengers was found in the estuary of the Somme.

Big U.S. Race Plan

An 18,000-mile international air race from Washington to Buenos Aires and back is the latest proposal. If the necessary support is obtained, it is expected to take place in October or November, the outward route being *via* the Atlantic coast, across the Caribbean Sea, Panama, down the west coast of South America, and over the Andes. The return journey would be along the east coast *via* Rio de Janeiro to Mexico, thence to Los Angeles, and across the United States to Washington.



CHILE! This Avro 626 (Siddley "Cheetah") training machine was flown over the Andes in mid-winter by Mr. H. A. Brown, the makers' chief test pilot, accompanied by his engineer, Mr. Harper. It was necessary to cross the range at 18,000 ft., and the machine was loaded to a gross weight of 3,250 lb. The "626" was the first of its type to be delivered to the Chilean Air Force. This group, taken at Santiago de Chile, shows (left to right) Senor Paul Besa, Comodoro Franki, Comodoro Don Diego Aracena (Chief of the Chilean Air Force), Mr. Brown and Commandante Castro.

An Appointment

Mr. T. Bird has been appointed Secretary of the Aerodromes Advisory Board in place of Mr. John Dower.

Another Zeppelin

Reports from Friedrichshafen state that the construction of a third Zeppelin, the L.Z.130, is to be begun next autumn. It will be a sister ship to the L.Z.129 now under construction, and will have approximately the same dimensions.

Twenty-five Years Ago

From "Flight" of January 29, 1910

"Although Mr. Claude Grahame-White's school for flyers at Pau has proved very popular, its distance from London is a great disadvantage, and so arrangements have been made with regard to an extensive tract of land near Hendon, which, when cleared, will, it is thought, form an ideal flying ground, giving a two-mile circuit. As soon as everything is ready Mr. Grahame-White hopes to transfer the six Blériot monoplanes which are at present at Pau to his new flying ground, and he is also making arrangements to secure two Henry Farman machines."

Capital-to-Capital Record

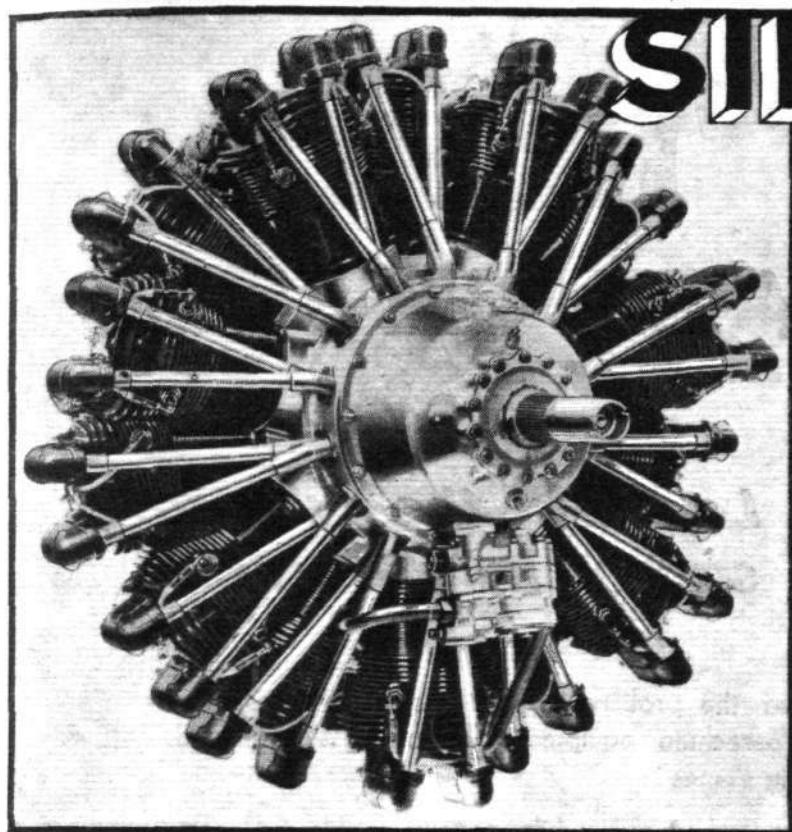
The Fédération Aéronautique Internationale have notified the Royal Aero Club that the first International Capital-to-Capital Record has been granted to Mr. C. W. A. Scott and Mr. T. Campbell Black for their flight from Mildenhall to Melbourne in 72 hr. 18 sec.

Winnie Mae Minus Wheels?

Wiley Post has taken his famous "Vega" *Winnie Mae* to the Lockheed factory to have it prepared for a non-stop Transcontinental record attempt. Flying at between 30,000 and 35,000 ft., Post plans to drop his undercarriage immediately after taking off and to use for landing a special skid which will be installed beneath the fuselage of the machine.

Royal Aero Club Awards

The Royal Aero Club has awarded the Britannia Trophy for the year 1934 to Mr. C. W. A. Scott and Mr. T. Campbell Black for their flight from Mildenhall to Melbourne. The Royal Aero Club has also awarded Gold Medals to Mr. C. W. A. Scott and Mr. T. Campbell Black in recognition of this flight, and Silver Medals to Mr. O. Cathcart Jones and Mr. Kenneth Waller in recognition of their meritorious long-distance flights during the year 1934, including the flight from London to Melbourne and back.



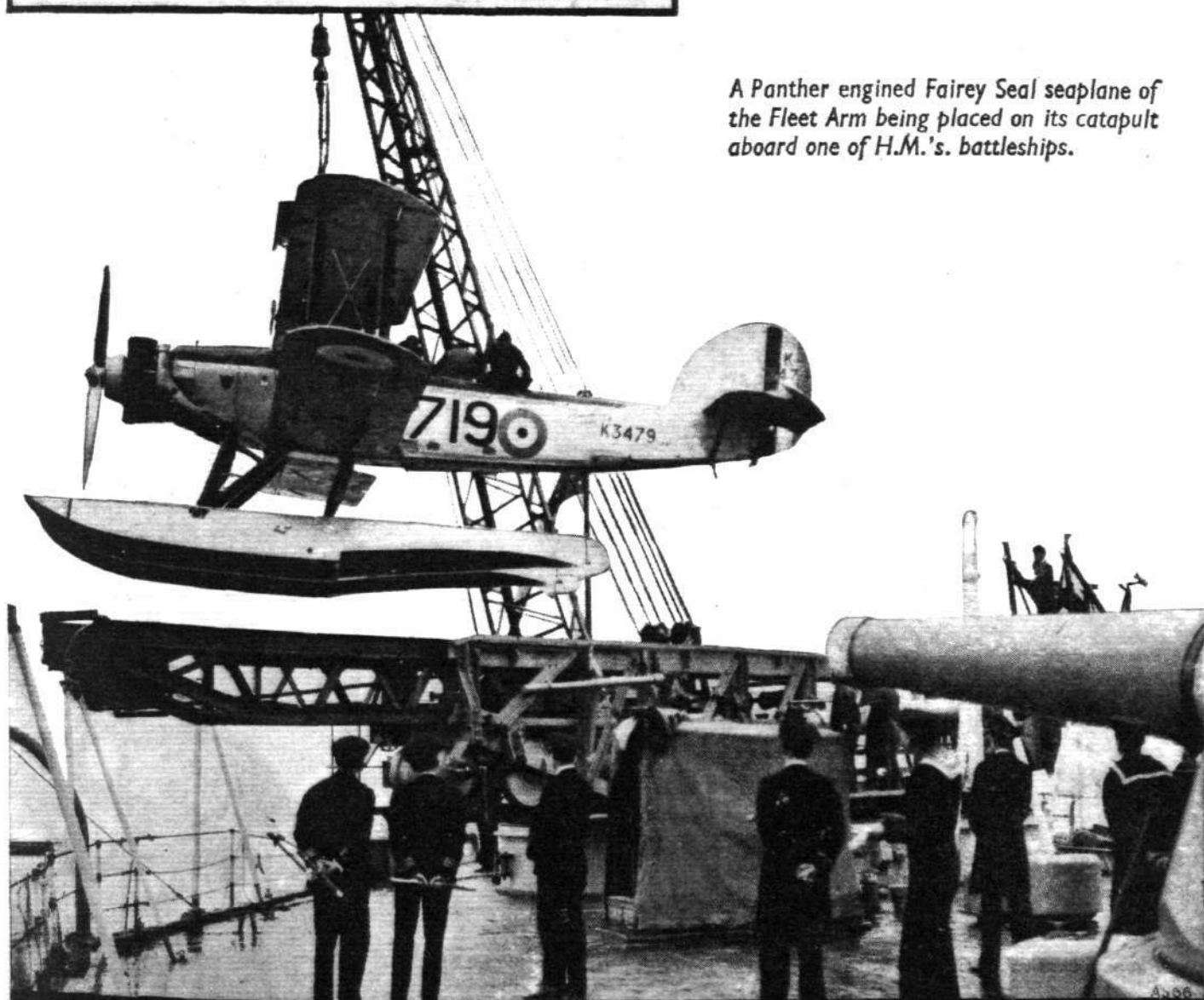
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A SHOW THIS YEAR?

From Mr. O. E. Simmonds, M.P., Secretary of the Parliamentary Air Committee.

[2998] We are all much in your debt for directing our attention now to the question of an aero show this year. The air at the moment undoubtedly holds the public interest, and it would be remiss of us not to encourage and develop this latent power of public opinion which, in the long run, is the arbiter of all our schemes. Flying is dynamic; the public wants no waxworks show. So far, the most popular air event, even for the man-in-the-street, is "S.B.A.C. Monday" at Hendon. Continue this for a fortnight, develop it to include all the Olympic side-shows, and I believe that for minimum expense we shall achieve maximum results. O. E. SIMMONDS.

London, W.C.2.

[2999] I was very interested to read the suggestion made by *Flight* that an aero show should be held some time this year, and I note that there appears to be some difficulty in finding a hall at a reasonable figure.

I consider that here in North London we have an ideal spot (for several reasons) for such an exhibition, i.e., the Alexandra Palace, which I feel sure could be hired at a much lower price than could Olympia. The reasons I give in its favour are:—

(1) It is within reasonable travelling distance of all districts now that the Piccadilly Tube runs to within ten minutes of its gates; also it is served by many excellent bus and tram services; is well situated as regards roads, and has plenty of parking space.

(2) It is situated in pleasant surroundings which command a grand view over and around London. Being on a hill it would lend itself to demonstration fly-pasts by manufacturers' planes, and they would be seen to excellent advantage from its terraces. Also, I should think that if interested people wished to obtain first-hand and practical demonstrations of manufacturers' planes the possibility of an Autogiro shuttle service with Hendon, Hatfield, Croydon or Heston would not prove an impossibility, as there is certainly plenty of room for such a machine to operate from should the powers concede the privilege.

(3) The main hall is big enough for the largest machines, and there are a number of annexes and small halls if required.

I put the foregoing to you in all good faith, having no pecuniary interest in the Palace other than as a ratepayer who subscribes to its upkeep.

CHARLES A. RIPPON

(Hon. Chairman, Northern Heights M.F.C.).

London, N.14.

THE GRID DANGER

[3000] Referring to your leading article in last week's *Flight* concerning the danger of grid cables to aircraft: When the weather is so thick that a pilot is flying across country so low as to be in danger of fouling the wires while in plain flight on his course, he has surely been guilty of a grave error of judgment in not landing before conditions became so bad.

Under these circumstances a tree is equally likely to be the cause of his downfall, while aircraft fitted with wireless and blind-flying instruments will presumably be high enough in any case to be out of danger.

The real danger of the grid appears rather to be that, as every pilot who flies across country knows, the pylons are impossible to pick out from above except in really good weather.

Not only, therefore, are they a real danger in forced landings through engine failure (though these are now fortunately rare), but also far more so to a pilot landing in a field in good time before the fog becomes really dangerous.

A simple safety measure might surely be to surround the base of each pylon with a small circle of chalk or cement—similar to that used to make an aerodrome, but, of course, in miniature—which would make the line of the wires easily seen without being either very expensive to do or unsightly from the ground.

A great deal would be accomplished if only those pylons were marked which are within danger limits of fields otherwise suitable as emergency landing grounds.

15, Cambridge Square, W.2.

R. SOMERSET.

REVOLUTIONARY!

[3001] I read with interest the article in last week's *Flight* entitled "Aircraft Armament Abroad," and I would like to add some of my own views.

First, is the machine gun any use against bombers? Secondly, with the high performance of modern bombers are interceptors capable of catching them, and are day-and-night fighters fast enough even if they are in the air?

My suggestion, therefore, is to use a larger machine, comparable with the *multiplace de combat*, carrying as armament two quick-firers similar to those used on the "Perth." Machine guns for defence against hostile fighters could be carried if necessary.

These machines, even to-day, could be made capable of a speed of nearly 250 m.p.h. (*vide* Breguet transport exhibited at the Paris Aero Show) and would have a considerable range.

Summarising the pros and cons, the result, I think, is as follows:—

Pros: (1) Long duration; (2) ability to carry large quantities of ammunition; (3) long range of quick-firers; (4) field of fire; (5) protection for crew from wind, etc.

Cons: (1) Expense; (2) speed not quite so high as that of fighters; (3) poor climb.

Of the cons, I think the only serious one is the expense. The speed will be high enough, and the climb would not be so important as the machines would be patrolling at high altitudes.

The method of attack would be to patrol at about 20,000 feet, and, on receiving warning of approach by radio, proceed towards hostile bombers; when sighted, fly level about 400 yards away, out of machine gun range, and blaze away with the quick-firers.

J. K. HILL.

Croydon, Surrey.

Diary of Forthcoming Events

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in this list.

Feb. 4. Jubilee Celebration of the Foundation of the City and Guilds College, Imperial College of Science and Technology.

Feb. 7. "The England-Australia Air Race." Lecture by Mr. C. W. A. Scott, at the Queen's Hall, London.

Feb. 8. "Ice Formation in Carburettors." R.Ae.S. Lecture by Mr. L. P. Coombes.

Feb. 15. Annual Aviation Ball, Bristol and Wessex Aeroplane Club, Grand Spar Hotel, Clifton.

Mar. 1. Annual Dance, Leicestershire Aero Club, Palais de Danse, Leicester.

Mar. 1. "Fuels for Aircraft Engines." R.Ae.S. Lecture by Mr. E. L. Bass.

Mar. 5. "Problems of Cold Presswork." Joint R.Ae.S. and Inst. A.E. Lecture by Dr. H. Gough and Dr. Desch.

Mar. 15. "New Developments of the Autogiro." R.Ae.S. Lecture by Senor Juan de la Cierva.

Mar. 29. "Piloting Commercial Aircraft." R.Ae.S. Lecture by Sqn. Ldr. H. G. Brackley.

Mar. 29. Annual Dinner, Norfolk and Norwich Aero Club, Mousehold Aerodrome.

Apr. 12. "Commercial Aircraft." R.Ae.S. Lecture by Capt. G. de Havilland.

May (Date not yet fixed). Wilbur Wright Lecture, R.Ae.S., by Mr. W. D. Douglas.

June 1. Brooklands "At Home."

HERE AND THERE

A Heavy Responsibility

Capt. V. H. Baker, chief pilot of Airwork, Ltd., has been given authoritative powers by the Air Ministry to control pilots at Heston. This will empower him to detain aircraft or personnel in any circumstances when they may act or be likely to act contrary to the provisions of the Air Navigation Act.

The powers in question are given under the provisions of the Air Navigation (Consolidation) Order, Article 10, and refer, in the main, to aircraft bearing the correct markings, aircraft being airworthy at the time of flight, the personnel having in their possession the appropriate licences, carrying munitions of war or flying in such a manner as to be a cause of danger to persons in the aircraft or to persons or property on the ground. A leading article on this new move will be found in this issue.

Amy Versus Jim

Women have an Engineering Society of their own. What women engineers do is not quite clear, but, whatever it may be, it is not likely to engender femininity. Nevertheless, some of the audience at the Society's debate on January 22 were very feminine. They were as conspicuous as roses in a desert—I noticed one "un-engineering"-looking young woman who was much more interested in a textbook of cookery (she was married!) than in Amy's discourse; wholly laudable, but very wrong of her, because, after all, she was there to learn from Mrs. Mollison that it was no longer possible to make money out of long-distance flights, because there was no publicity to be gained out of them. Amy waxed quite lyrical when she "de-bunked" the "exclusive-story-of-the-flight" racket, and I, for one, thought that she proved her point up to the hilt. She did digress a little when she entered the realms of fancy and prophesied that the aeroplanes of the future would be like submarines, closed-up and air-conditioned, but her main point was that, while record flights of the International Record type were useful, the day of the stunt flight was over. A truthful statement.

Her husband took the opposite view—although he spoilt his case entirely, by saying that he was only doing so for the debate and agreed with Amy in reality! However, although his arguments were almost as much for the motion as against, the fickleness of the feminine mind came to his rescue when the vote was taken, and carried the day for him with a large majority. Perhaps the voters were swayed by his announcement that he intended to make a prolonged flight in the stratosphere when he had found a backer. C. N. C.

The Third Degree!

Some remarkable facts emerge from a test recently carried out on a standard "Pegasus IIM" engine by the Bristol Company at their Filton works.

The primary reason for the test was to demonstrate the reliability of the "Pegasus II," and accordingly an engine of this type was submitted to extended full-throttle tests under official supervision. The maximum permissible output of the "Pegasus IIM" engine is 635 b.h.p. at a maximum of 2,300 r.p.m. for not more than five minutes' duration. The engine in question was maintained at 670 b.h.p. for 300 hours, in fifteen-hour periods for the first 200 hours, and in ten-hour periods for the third 100 hours. These extremely arduous series of tests were completed without failure or breakdown.

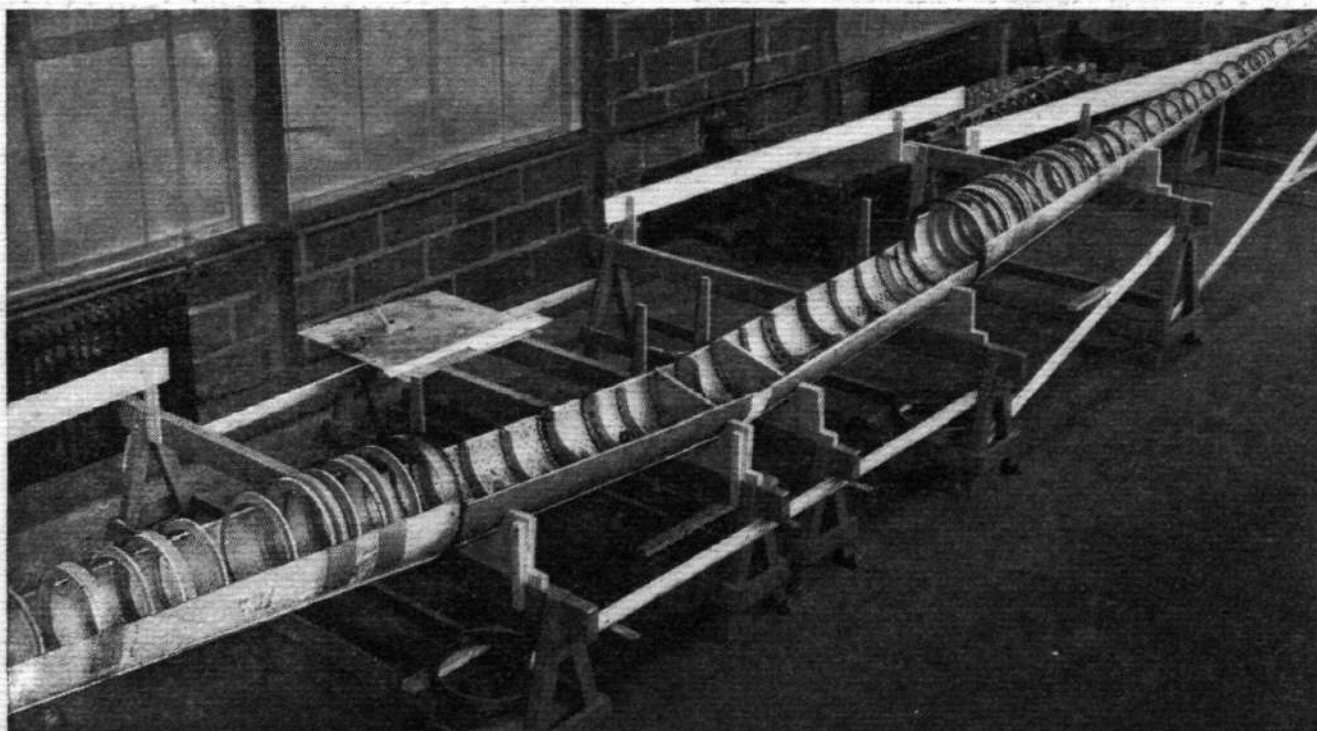
At the end of each 100 hours' running, state the makers, the engine was completely stripped, and on examination it was found that no replacements were needed either at the conclusion of each test or over the whole period, with the exception of such standard items as washers, split-pins, and a small percentage of piston rings.

Specialists in Hire Purchase

There are two reasons why a new company, Aircraft Facilities, Ltd., which has recently been formed to deal with the hire purchase of aircraft, should be of value to prospective owners. In the first place it is, as far as is known, the only company to specialise in this business; and secondly, they have come to an agreement, after consultations lasting some time, with the insurance brokers. Consequently, the proposal form is simplified and the actual suppliers of the machine are free of any responsibility so long as the details entered on the form are correct.

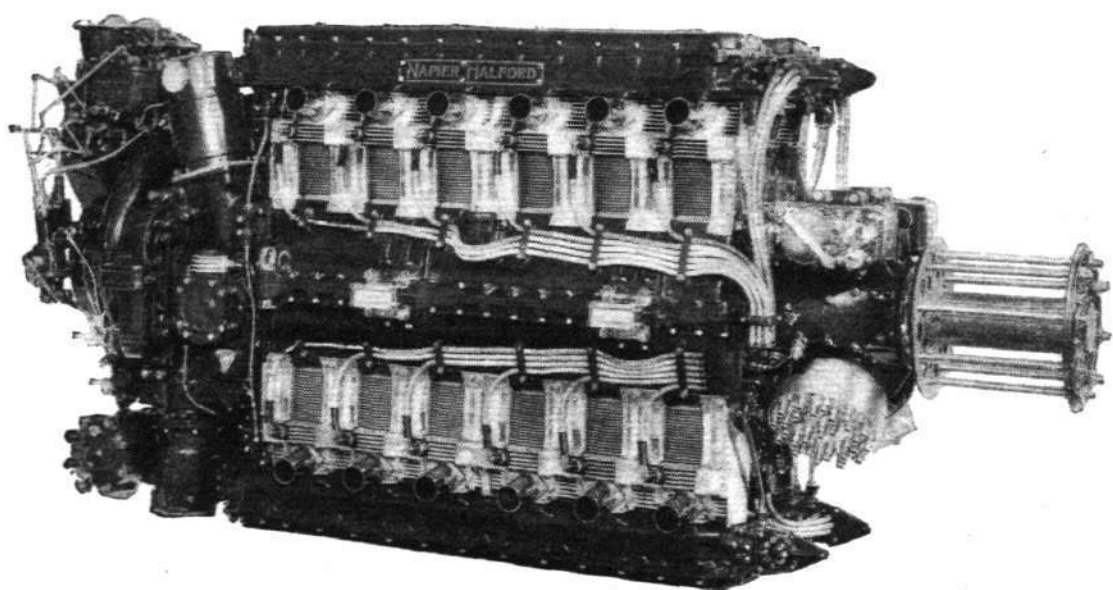
Briefly, the customer pays to the suppliers a deposit of 25 per cent. of the value of his machine, arranges with the company's brokers about insurance and pays the balance, plus a charge of 7½ per cent., in twelve monthly instalments.

The board of directors of Aircraft Facilities, Ltd., has been chosen for their experience in the particular business. Air Comdre. B. C. H. Drew, C.M.G., C.B.E., who is well known as the secretary of the R.A.F. Display, is chairman, and there are two chartered accountants who are well versed in hire-purchase business. In addition, there are Mr. C. A. Pike and Mr. O. M. Hills, who are also well known in the civil aviation world. Furthermore, the company will have the co-operation of Mr. Anthony Wrightson, representing Matthews, Wrightson and Co., the insurance people. The address of the company is 6, Broad Street Place, London, E.C.2.



TAKING SHAPE : The single spar for the Blackburn-Duncanson H.S.T.10 monoplane described in *Flight* of November 29, 1934, is one of the components now nearing completion. The central portion of the built-up tubular spar forms the petrol tank, so that the weight of separate tanks is saved. (*Flight* photograph.)

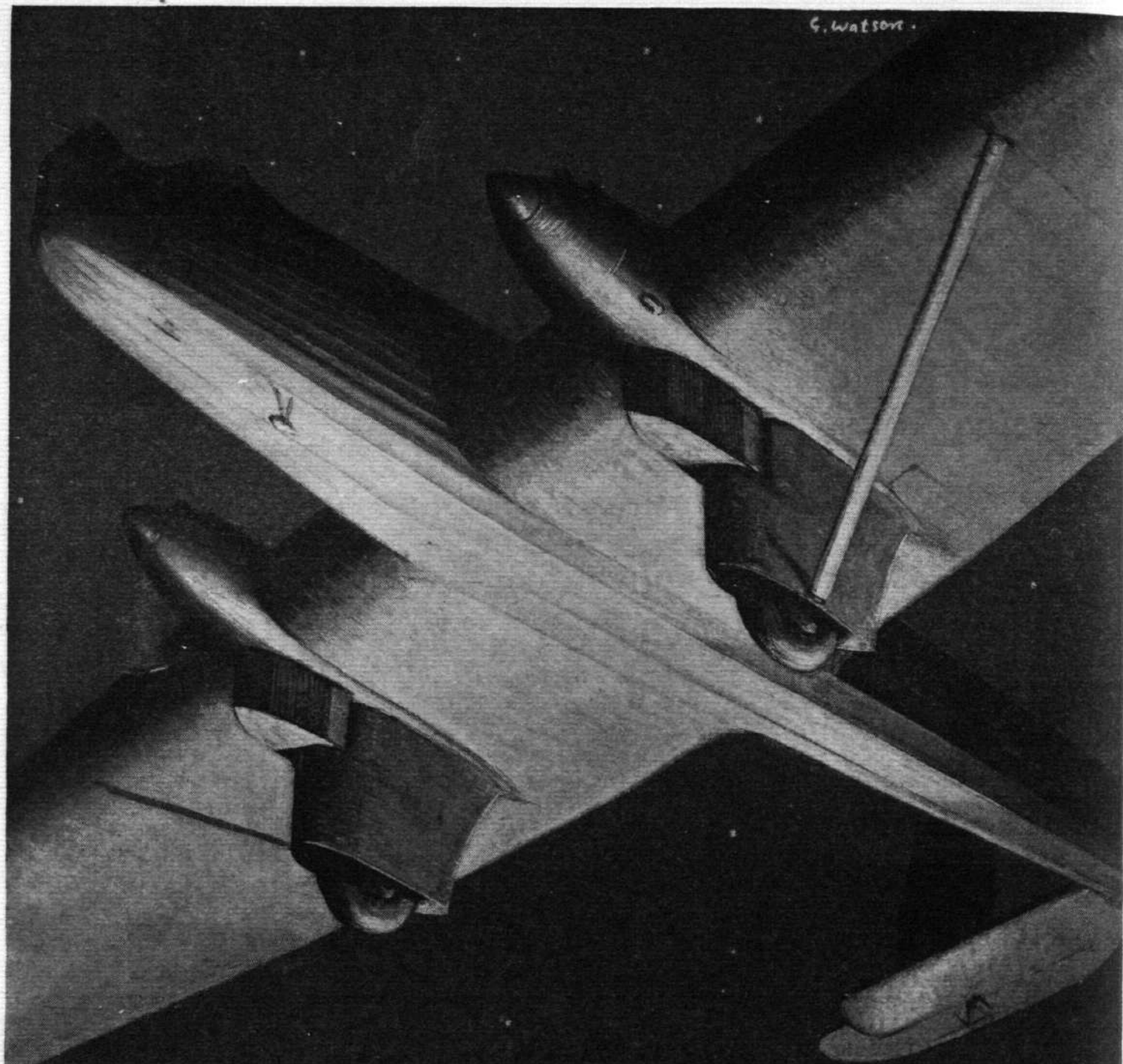
Dagger



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The AIRCRAFT ENGINEER

"FLIGHT" ENGINEERING SECTION

Edited by C. M. POULSEN

No. 108 (Volume X) 10th Year
No. 1

January 31, 1935

SOME NOTES on the PARIS AERO SHOW

By H. J. POLLARD, Wh.Ex., A.F.R.Ae.Soc.

(Concluded from page 95 of December 27, 1934, Issue)

Last Month Mr. Pollard dealt with Metal Construction. This Month he has chosen for his Main Subject Retractable Undercarriages, but he also has something to say about Magnesium Alloys

THE extent to which wing flaps and retractile undercarriages had been embodied in designs were other items on which information was sought. In regard to split trailing-edge flaps, only two or three machines were so fitted (notable among them being the Heinkel He 70); the mode of operation was in no case clear, but, on the other hand, some information was to be obtained on the operating mechanisms for undercarriage retracting gears, and some of these were most interesting. Most of the types exhibited are illustrated in Figs. 1 to 7.

Figs. 1 to 4 (taken from *L'Aeronautique*) show four different systems of retraction developed by the Potez Company.

Fig. 1 illustrates the method used on the Potez 54. Each wheel is held in a fork F which also forms the housing for the shock-absorber system. This fork is held by rear struts which are articulated at A, and their upper half forms the base of a pyramid with apex at P. Retraction is effected by pulling on P by means of the hydraulic ram and cylinder R.

In the case of Fig. 2, each pair of wheels is carried on a separate axle which is mounted on bar B, which in its turn is articulated at each of its extremities on absorbers A and A'. The system is braced by strut T. Retraction into the cavity is effected by pulling on T via a long screw and nut. In the first part of the lifting the horizontal movement forward x is much greater than the vertical lift y , which, incidentally, permits of altering the relative position of the wheels in relation to the C.G. of the aircraft—that is, the distribution of the loads between the wheels and the skid can be varied.

Fig. 3 shows the arrangement on Potez types 532 and 533. In this case two radius rods are secured at A on the oleo leg by a cardan joint; the top of the leg is articulated on ring

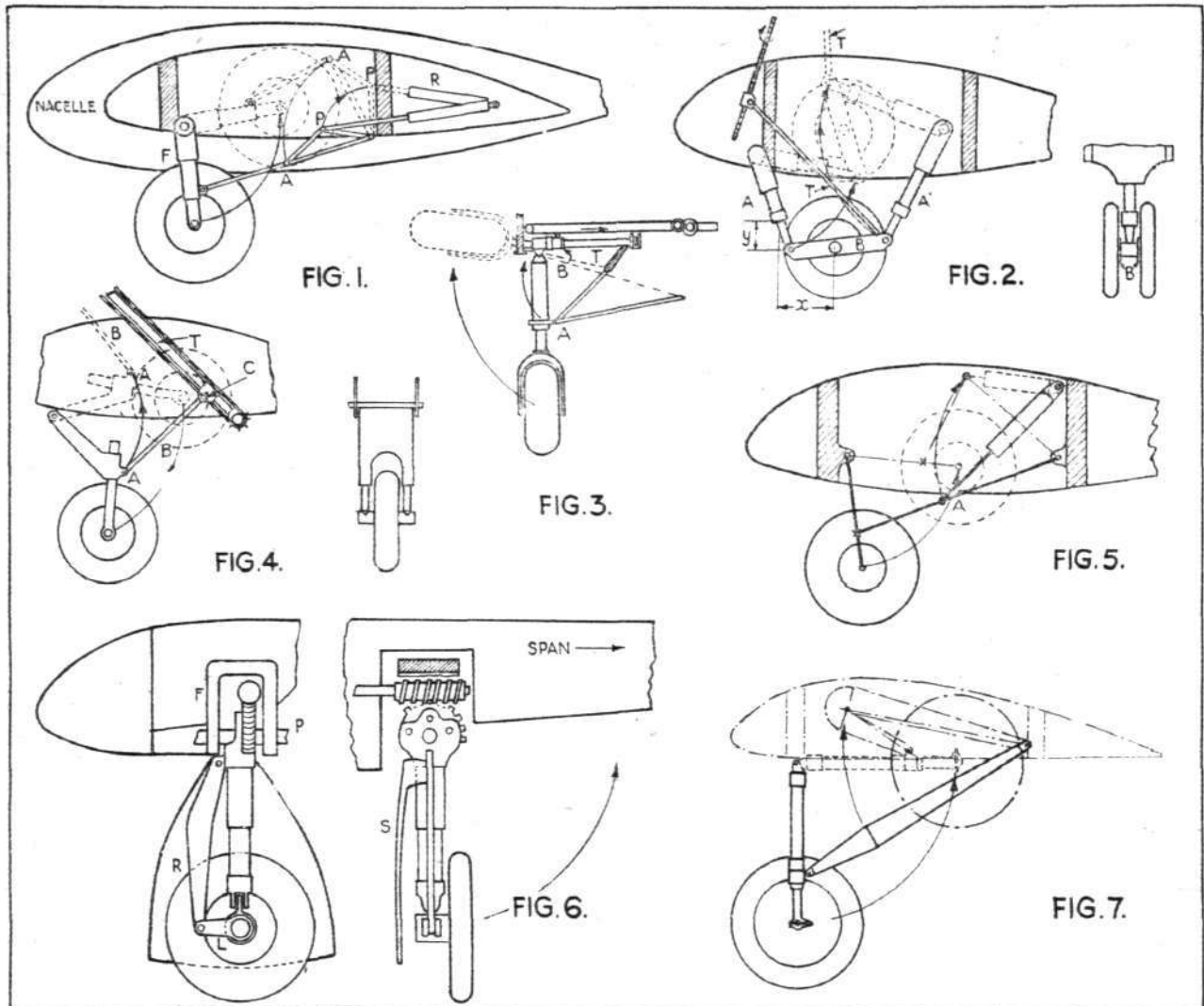
B, which is moved along tube T by means of a cable, and retraction is effected by pulling on B.

Fig. 4 illustrates the method used on the Potez type 56. The wheel of each half of the complete undercarriage is held in a fork which is secured by rearward struts B, the latter being articulated at A on the fork. The upper extremity of each strut is mounted on a frame on a slide C which can move along an oblique tube T. Retraction is effected by pulling on C in a manner similar to that shown in Fig. 3, except that a chain is used in place of the cable, and in this case it would seem that power greater than manual effort would be necessary to operate the mechanism.

Another retractile undercarriage on view was that designed by Messier; this, as well as being demonstrated on the Messier stand, was also embodied in the Bloch 211B. The design appears to be very similar to that given in Fig. 1 above, except that the pyramid arrangement of struts is not employed, the push taking place directly at point of articulation A (see Fig. 5). Both in this and the Potez 54 design rubber cord is used to "break the joint." Power for retraction was supplied by electric motor and oil pump.

In both cases, also, locks were provided so that the piston-cylinder system becomes part of the structure for the purpose of resisting backward forces.

The form of undercarriage used on the Messerschmitt Me 108 is shown in Fig. 6. This arrangement might be termed daring in conception and execution, but it is clearly satisfactory, since it has been adopted for their regular production aircraft. The sideways force on each wheel appears to be resisted by a couple set up between the pin at the axis of rotation P and the side-thrust between the worm and the teeth in the quadrant, the operation of which



retracts or lowers the wing. The drag forces set up on landing are transmitted to the wing as a whole via the fitting F which carries the pin at the axis of retraction. The radius rod R and link L come into operation as the oleo leg is compressed.

Non-retractile cantilever undercarriages were much in evidence, notably on the Caudron C 600, Dewoitine 511 and all Hanriot types.

Retractile undercarriages have, of course, been adopted in this country, and descriptions of them have appeared in the technical journals; in fact, both the Potez and Messier gears are practically identical with the design used on the Airspeed "Courier."

The Dowty Gear

Fig. 7 shows Mr. Dowty's exceedingly neat arrangement of folding gear. All the operating mechanism is hidden in the hinged radius rod itself. In regard to undercarriages generally there is no denying the fact that retracting gears have been a long time in developing. To the best of my recollection the first was shown in 1930 on the Couzinet tri-motor. In 1932 the designer had, for some reason or other, abandoned the retractile undercarriage for a fixed one, while in the same Show a moving undercarriage was shown fitted to a Breguet aircraft, operation being mechanical. Some at least among the present types (and those described above were not all that were on view) will certainly survive hard testing and usage, so that we can definitely accept the retracting undercarriage as an accomplished fact. However, some of the simple cantilever fixed undercarriage certainly demand great respect from the viewpoint of simplicity and low drag when properly faired, and, consequently, it is not likely that these will be com-

pletely ousted on slow- or medium-speed machines by the moving type, even on aircraft where retraction is possible, i.e., in low-wing cantilever designs. On the fastest types (speeds of 180 m.p.h. and over) the use of the retracting type should become universal.

The exhibits in the galleries, particularly of instruments, controls, riveting appliances, etc., were of interest; detailed descriptions here are, however, out of the question. A few observations on materials must suffice.

Magnesium Alloys

As to the magnesium alloys, here is a material that should be eminently suited for *monocoque* work and for wing and empennage surface coverings. One exhibitor, the Société Générale de Magnésium, had a variety of samples on their stand in the gallery, among them lengths of strip rolled or drawn into sections suitable for stressed-skin work. The reader may be aware that this material must be heated to a temperature approaching 350 deg. C., and the tools must also be hot, at the time of forming to the required section; clearly there are technical difficulties attendant on this. Unfortunately, demonstrators capable of describing exactly how the operations can be carried out successfully are never available to explain these things to enquirers—probably their technical knowledge is required in the factory. There is surely, however, a great art here awaiting development for use in the aircraft industry; the matter is clearly one of great difficulty. As well as the hot forming of sections mentioned, hot heading of rivets in place is a still more difficult proposition. Apart from difficulties in working, the connecting of magnesium alloys with other metals in a structure would be certain to give rise to corrosion trouble unless special precautions were taken; while adequate in-

sulation might be afforded to the areas in contact of a few reinforcing members (i.e., the sides of aluminium alloy angles and channels in contact with sheet magnesium alloy), the action that might be set up by a few thousand duralumin rivet shanks in contact with the sides of holes pierced in magnesium sheet is not a matter that can be lightly ignored.

These difficulties must be tackled so that advantage may be taken of the use of magnesium alloy sheet and strip in stressed-skin structures. If, however, structural progress in the use of aluminium alloy sheeting, as shown in the Grand Palais this last few exhibitions is any criterion, then many years will pass before the technical reviewer will have anything worth while to say on magnesium alloy strip as a practical material for use in aircraft structural engineering.

Having referred to the corrosive effects of different metals in contact (set up by electrolytic action) it is opportune to say that the subject of corrosion received considerable publicity in the section of the gallery occupied by the

machined on the inside, a small ridge R being left on the inside at one end. The specimen is then put on a special mandril and machined down until it is only a few thousandths of an inch thick.

The test apparatus consists of a vessel containing water of specified salt content, and the specimen is suspended in the liquid by means of the supporting members, which grip the cylinder at the ridge.

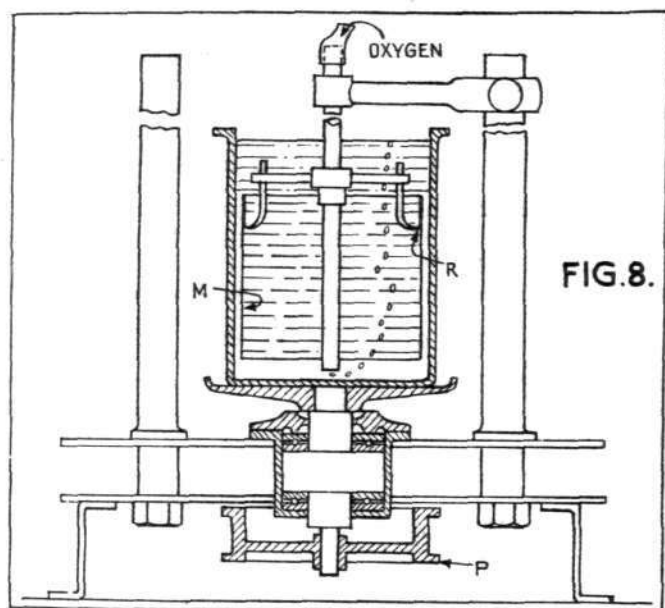
The container is given a rotary motion through the pulley P. While the vessel is in rotation, oxygen is blown through the liquid, thus accelerating the corrosion. At the end of the specified time the specimen can be cut and laid flat for photographic, microscopic, or other examination.

One method of examination is carried out through a study of light reflected from corroded surfaces, and a theory has been established in connection therewith. The basic assumption underlying the theory is, however, that the corroded cavities reflecting the light are hemispherical in shape. No experimental data appeared to be on view among the exhibits or diagrams in support of that assumption.

One is bound to say that the preponderance of the old and uninteresting over hoped-for new and interesting features in the many exhibits, together with the fact that for every pound spent one got only about five shillings worth of value judged by British standards, forces one to the conclusion that it is high time we had another aircraft exhibition in London. [As strongly advocated in recent issues of *Flight*.—Ed.] An exhibition at Olympia in 1936 would make the third since the War—at about eight-year intervals—the first post-War exhibition having been held in 1920.

One feels certain that such a show would, in fact, be the first show which would be visited by many of the public for the express purpose of buying aeroplanes. It is suggested that by choosing a period in the early summer when flying is coming into full swing, this safe and swift means of transport would be utilised by aeronautical people of other nations visiting London.

At such an exhibition British constructors would, to a firm, vie with each other in demonstrating the minutest technical details of their structures and installations, and as a consequence the exhibition would arouse more real interest than a Continental show has ever done. Then, perhaps, a London aircraft show might be staged more frequently, and, when established as the Motor Car Show is, become recognised as the World's Premier aircraft exhibition.



Ministère de L'Air. Space does not permit of detailed descriptions, but a device for obtaining information rapidly on the corrosive effect of sea water on different materials appeared to be well worth attention.

This is illustrated in Fig. 8. The strip material M to be tested is bent into a cylindrical shape, the longitudinal edges being welded together. This cylinder is

TURBULENCE NEAR THE GROUND

German Research Explained to R.Ae.S.

SPEAKING before the Royal Aeronautical Society recently, Herr Wilhelm Schmidt explained some of the conclusions reached during a series of extensive experiments carried out with help from the *Notgemeinschaft der Deutschen Wissenschaft*. The experiments were designed to discover the extent, magnitude and form of the turbulence of air near the ground. For this small wire rings 20 cm. in diameter covered with muslin were used. These "plates" were pivoted so that the angles they took up could be measured and plotted. A number of slides were shown with the result of these plottings in the form of diagrams, giving a clear idea of the nature of the turbulence over different surfaces.

Although the experiments were confined to heights of

very few metres above the ground, in a general summary, wherein the effect of this turbulence was translated to higher altitudes, Herr Schmidt explained that it was evident that turbulence was generated both by dynamic and thermic action, but that it was impossible to separate these effects. He maintained that real vortices were not essential for turbulent motion, because gusts from fast-travelling layers of air will readily intrude into more passive layers, and that a rough surface near the ground will smooth the turbulence higher up. For example, over a large uniform forest the turbulence is greater in the lower layers but damped in the higher ones. In conclusion, he felt that the results obtained could already, by utilising Reynolds Law of Similarity, be applied to landing conditions.

THE SPEED and DRAG of COMMERCIAL AEROPLANES

By W. O. MANNING, F.R.Ae.S.

Mr. Manning, one of the earliest British Aircraft Designers, calls attention to the Possibilities of obtaining extra Speed without incurring extra Cost

THE question of the effect of the speed of aircraft on running costs has recently become prominent, and there seems to be a certain school of opinion which assumes that speed must always increase cost. This opinion seems to be based on experience with railways and motor cars, but the case of aircraft is different from other means of transport.

With aircraft, all the important operating costs, except the cost of fuel, decrease with increased speed. This is due to the fact that these costs depend on the hours that the machine spends in the air and it is obvious that the larger the number of miles the aeroplane can fly in an hour, the less these costs are per mile flown. There is not, as in the case of the railway, additional expense due to the effect of speed on the upkeep of a track, or, as in the case of a motor vehicle, increased wear of expensive tyres due to the same cause. So high speed of flight will be economical provided any increased cost of fuel does not overbalance savings in other directions.

The amount of energy required to fly from one place to another is simply the resistance or drag of the aeroplane multiplied by the distance, and, assuming what is approximately true, that the energy content of the fuel, the thermal efficiency of the engine, and the propulsive efficiency are roughly equal for commercial types of aeroplanes, the fuel required for a flight can be ascertained by multiplying the drag of the aeroplane by the distance flown and multiplying the result by a constant. It will be seen that speed does not come into the matter directly. It is quite true that if one takes any particular aeroplane and increases its speed by using additional horse power, the drag and consequently the fuel consumption per mile will also be increased. But this increased fuel consumption is not due to speed as such, but to the fact that speed, in this particular instance, increases drag.

The "All Wing" Ideal

Suppose it were possible to build an aeroplane consisting of nothing but a wing, and that this wing could be altered in area as desired during flight. As the area could be made anything that was required it would be possible to keep the $\frac{L}{D}$ of the machine constant and its drag constant

at almost any speed at which it was flying. Hence the fuel consumption per mile would also be constant, and, therefore independent of speed, though the horse power required would increase with the speed. Double the horse power would be required to double the speed, but, as the machine would get to its destination in half the time the fuel per mile would be constant.

The drag is therefore of vital importance to the commercial operation of aircraft, and, other things being equal, the best commercial aeroplane is the one possessing the minimum drag at the required flying speed, because it not only will be operating at the minimum fuel cost but because, as we will see later on, a low drag means a larger revenue load. Yet we see photographs of commercial aeroplanes equipped with masts and flags, a most excellent way of increasing drag and reducing payloads; an addi-

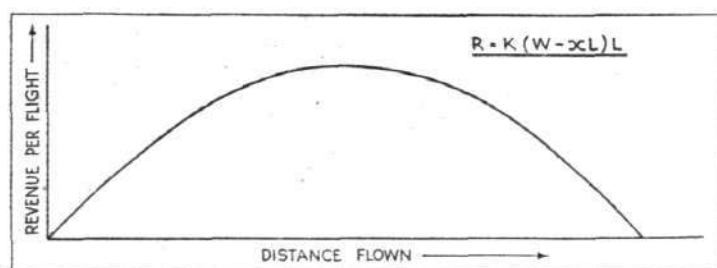
tional drag of only ten pounds will absorb about $3\frac{1}{2}$ horse power at 100 miles an hour and will use about $1\frac{1}{4}$ lb. additional fuel in the same time, or, say an additional gallon of petrol on a flight from London to Paris and back.

These considerations affect all types of aircraft. Suppose that it was required to design an aeroplane having the maximum possible range. Provided other matters were equal, the machine could be compared by the simple ratio

$\frac{P}{D}$ where P is the amount of fuel carried and D is the drag.

The ratio is independent of such considerations as size, horse power, or anything else. That this is valid may be seen easily when it is remembered that fuel consumption per mile is approximately drag multiplied by a constant,

so the ratio $\frac{P}{D}$ can be counted to $\frac{P}{x}$ where x is the fuel consumption per mile say, by means of a constant, and the range is obviously the fuel carried divided by the fuel consumption per mile.



This matter of fuel consumption per mile, or drag, also affects revenue. Let it be assumed that you are being paid for the transport of goods at the rate of so much per ton mile, then the revenue that you will earn per flight will be:—

$$R = K(W - xL)L$$

where R is gross revenue per flight in, say, pounds sterling
K is a factor converting say, ton miles into pounds sterling

L is distance flown

x is weight of fuel per mile say

W is weight of revenue load + weight of fuel.

R is obviously = D before the machine has started its flight as then $L = D$ and it is also zero when xL , which is the weight of fuel used on the flight, is equal to W, so the curve becomes zero at each end but has obviously some value in the middle.

$$R = KWL - KxL^2$$

Differentiating,

$$\frac{dR}{dL} = KW - 2KxL$$

Now R, the revenue per flight, will be at a maximum

when $\frac{dR}{dL} = D$, so

$$KW - 2KxL = D$$

$$\text{or } L = \frac{W}{2x}$$

so the maximum gross revenue per flight will be earned when the weight of revenue load + fuel divided by twice the fuel consumption per mile, say, is numerically equal to the distance flown. Let us substitute this value for L in the first equation.

$$R = \frac{KW^2}{2x} - \frac{KxW^2}{4x^2}$$

$$R = \frac{W^2}{4x}$$

which expresses the maximum gross revenue which can be earned by any aeroplane on any one flight on the basis

given. The effect of fuel consumption will be noticed.

The importance, commercially, of reducing the drag to a minimum is a matter which seems to have been first realised by the Americans, and is the principal lesson to be learnt from such machines as the Douglas. This aeroplane is probably not an ideal type for use on our Empire Air Routes, whatever may be the case for the transcontinental route for which it was designed, but it does represent a very definite and successful attempt to reduce the drag of an aeroplane to a minimum as far as our present knowledge will allow, and this is an example which we should copy whatever the proposed speed may be of the aeroplanes we intend to use on our own routes.

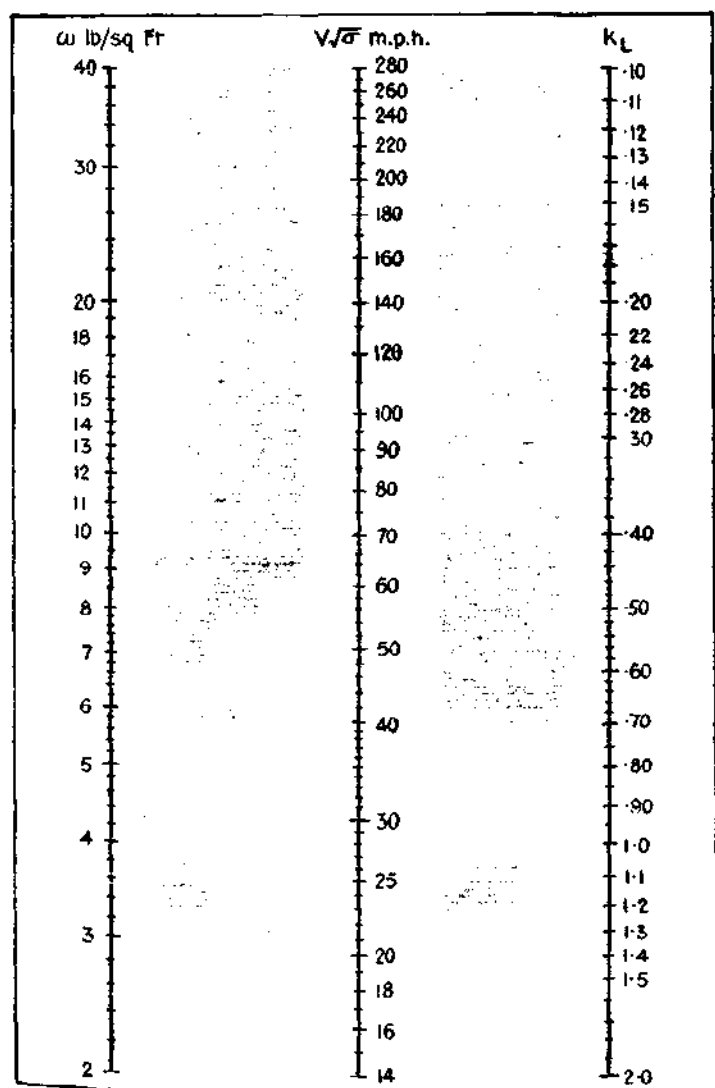
SOME USEFUL NOMOGRAMS

By NORMAN SYKES, B.Sc., A.F.R.Ae.S.

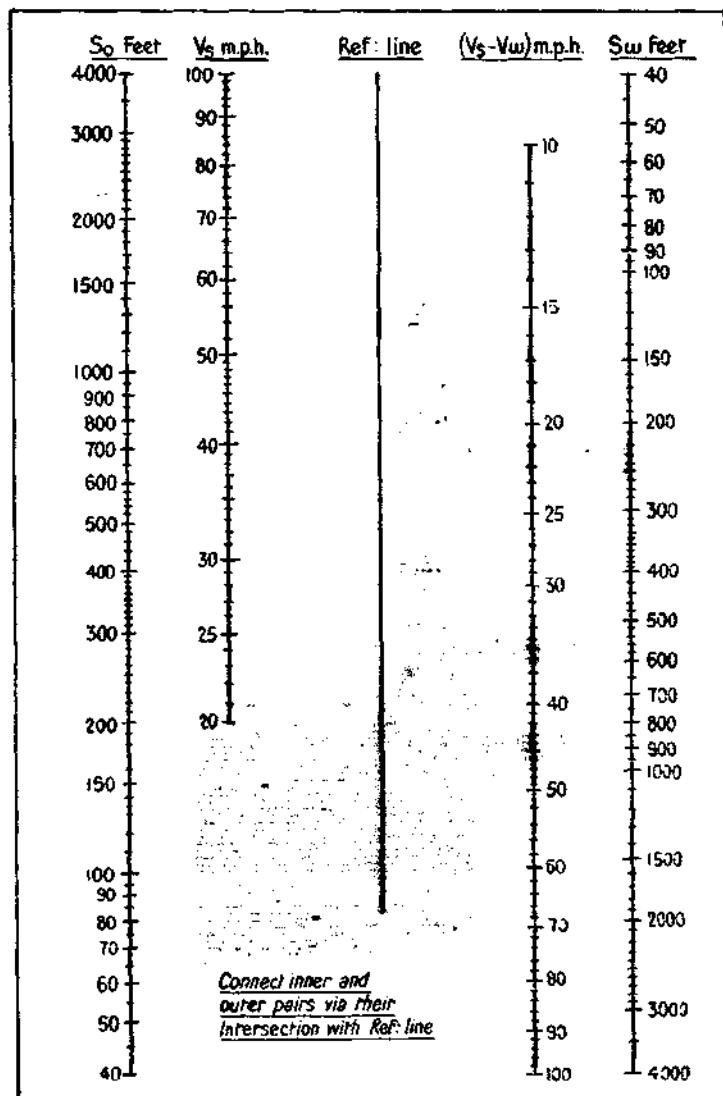
THE nomogram is a very handy instrument for connecting a number of variables. By now its use is becoming fairly general, but there are still those who prefer the slide rule for every fresh problem. Sometimes, however, the slide rule has been mislaid, or the fundamental formula has been forgotten, and reference must then be made to a text book before the work can proceed. In such cases the nomogram is extremely handy, and it is thought that the following four will find ready application in many drawing offices. They have been

prepared by Mr. Sykes in the course of his work in the Technical Department of A. V. Roe & Co., Ltd., where they have been found very useful.

It is likely that most readers will be quite familiar with the use of a nomogram, but for the benefit of any who may be in doubt, the simplest is that connecting wing loading, lift coefficient and airspeed. The fundamental formula is, of course, L (Lift) = W (Weight) = $0.002378 \rho a k_L S V^2$, where ρ is the density of the air, σ the relative density at height, k_L the lift coefficient, S the wing area in sq. ft., and

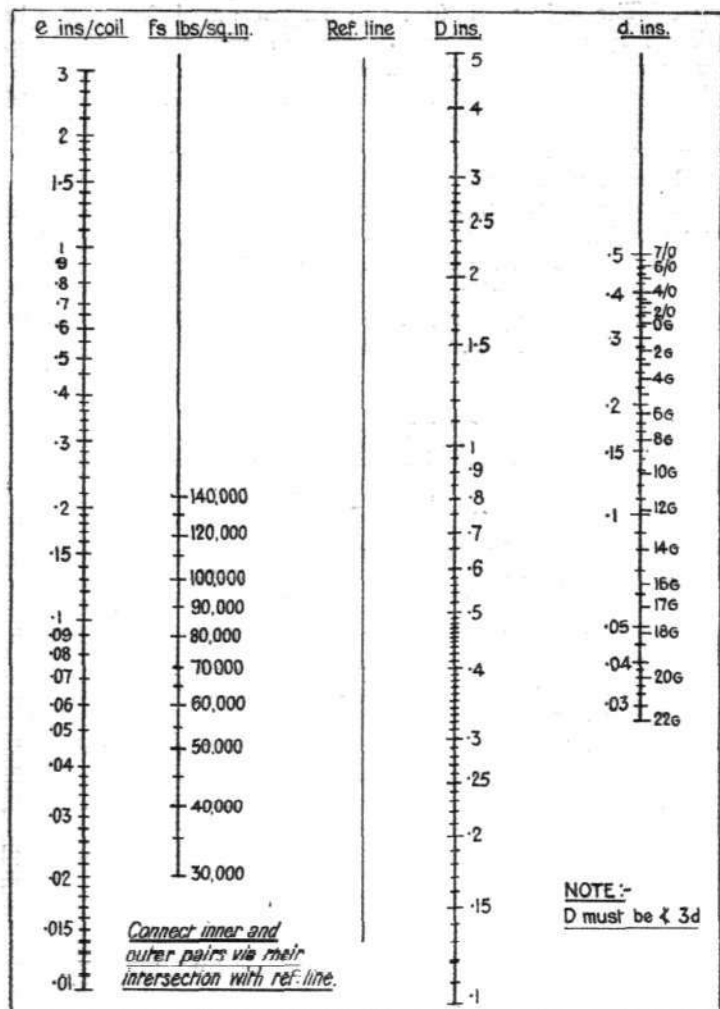


Nomogram connecting indicated air speed, wing loading and k_L . The formula is: $V\sqrt{\sigma} = 14\sqrt{w/k_L}$. At sea level $\sqrt{\sigma} = 1.0$ and therefore $V\sqrt{\sigma}$ is true air speed. Best climbing speed and most economic cruising speed occur at $k_L = 0.33$ approx.

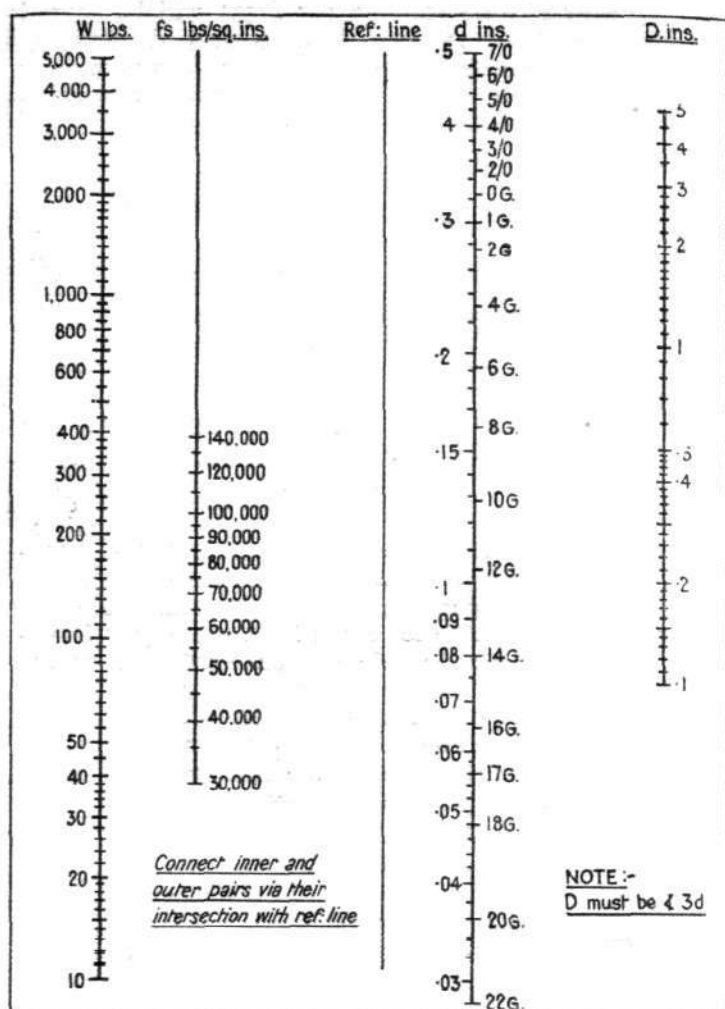


Nomogram for wind correction of take-off run. The formula is: $S_w = \left(\frac{V_s - V_w}{V_s}\right)^{1.85} S_0$, where S_w is take-off run in wind of speed V_w m.p.h. S_0 = take-off run in still air, and V_s = take-off speed in m.p.h.

THE AIRCRAFT ENGINEER



Nomogram for helical steel springs (solid circular wire). The formula is : $W = \frac{\pi}{8} f_s \frac{d^3}{D}$, where f_s = shearing stress, d = wire diam. and D = mean diam. of coils. W is the load.



Nomogram for helical steel springs (solid circular wire). The formula is : $e = \frac{.261}{10^6} f_s \frac{D^2}{d}$, where f_s = shearing stress, d = wire diam., D = mean diam. of coils, and e the deflection per coil.

V the airspeed. When 0.002378 is used, V will be in ft./sec. If it is desired to use V in m.p.h. the value becomes 0.0051.

Following are Mr. Sykes's explanations of his four nomograms :

(1) Nomogram connecting $V\sqrt{\sigma}$, W and k_L : This represents the fundamental equation $L = k_L \rho S V^2$ and a straight-edge laid across the chart connects values of the three variables in accordance with the above formula. The chief use of this nomogram is in the rapid estimation of landing speeds and the effects of higher k_L due to the use of flap-gear, etc.

(2) Nomogram for wind correction of take-off run: This chart has been prepared to eliminate the calculation involved in the use of the usual graph (given, for example, in N.A.C.A. Report No. 450—"The Calculation of Take-off Run," by Walter S. Diehl). The law of this graph is

$\frac{S_w}{S_o} = \left(\frac{V_s - V_w}{V_s} \right)^{1.85}$ and on this formula the nomogram is based. The difference between take-off speed and wind speed ($V_s - V_w$) must be separately calculated, but this can be done mentally. Any variable may be found when the other three are known—always remembering that the inner pair of lines and the other pair of lines are to be connected.

(3) and (4) Nomograms for helical steel springs. These charts are based on the well-known formulæ for max. load $W = \frac{\pi}{8} f_s \frac{d^3}{D}$ and max. extension per coil $= \frac{\pi f_s D^2}{Gd}$. G is taken as 12×10^6 lb./sq.in., being derived from official tests.

The range 10lb. to 5,000lb. will be found to cover spring sizes usually employed in aircraft engineering.

RECORDING TURBULENT FLOW

NOTE ON THE USE OF THE INTERFEROMETER FOR RECORDING TURBULENT FLOW. By L. F. G. SIMMONS, M.A., A.R.C.S., and C. SALTER, M.A. R. & M. No. 1454. (3 pages and 11 diagrams.) February 5, 1932. Price 9d. net.

Experiments are described in which an interferometer was used to reveal a jet of carbon dioxide gas issuing from a small tube. In the course of the experiments spark photographs of the jet were taken with a monochromatic fringe system, and also with white light fringes widely separated to give a nearly uniformly illuminated field. A few specimen photographs are reproduced and these show the parallel form of the jet at low speeds, and the expansion which takes place at a short distance from the tube when the velocity reaches about 700 centimetres per second. Since fringes can only be produced in the absence of mechanical vibration, it is

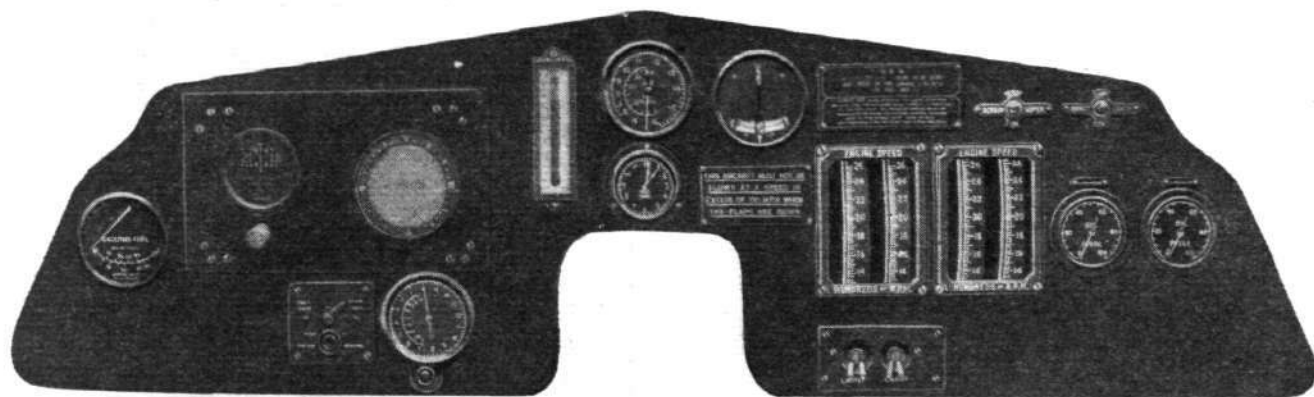
doubtful whether the method will prove useful in the investigation of problems of fluid motion met with in aerodynamical research. Though the interferometer has been applied to investigations of fluid motion, as far as is known there is no record of its application to problems of turbulent flow.

With an electric spark as the source of illumination in place of a mercury vapour lamp, it proved possible to photograph the steady and also the turbulent flow of a jet of gas issuing from a pipe. The best results were obtained with the fringes adjusted for monochromatic light, although the definition of the lines was necessarily impaired somewhat by the absence of a monochromatic source. Photographs were also taken with a white-light fringe system, which showed improved definition, but suffered from a loss of general uniformity throughout the field, owing to imperfections of the mirrors that were available at the time the experiments were made.

Details of the method used are described and a few specimen photographs are appended at the end of the report.



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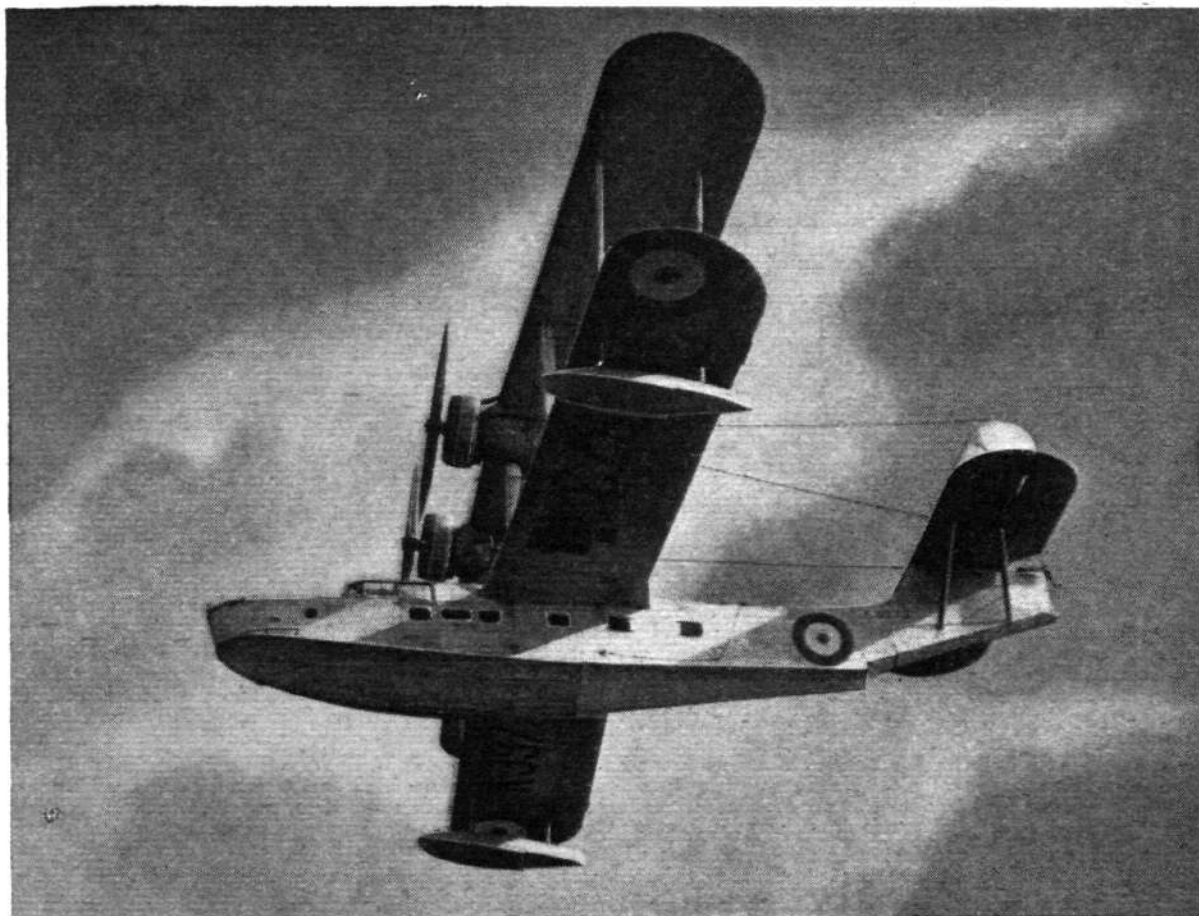
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SERVICE NOTES AND NEWS



AIR MINISTRY ANNOUNCEMENTS



FOR OPEN-SEA RECONNAISSANCE: The new Vickers-Supermarine flying boat, fitted with two Bristol "Pegasus" engines. Another photograph appears on page 116.

HONOUR FOR AN OFFICER

The *London Gazette* of January 22 announced that the King had approved the award of the Distinguished Flying Cross to Sqn. Ldr. Herbert Bainbridge Russell, A.F.C., R.A.F., for "gallant and distinguished service" in the Aden Protectorate. The following were mentioned in despatches by Group Capt.

(now Air Commodore) C. F. A. Portal, D.S.O., M.C., commanding British Forces in Aden, "for distinguished services rendered in connection with the operations in the Aden Protectorate during the period March 22 to May 21, 1934":

Flt. Lt. D. Macfadyen, Cpl. C. Stokes, and L.A.C. (now Cpl.) L. E. Stack.

ROYAL AIR FORCE GAZETTE

London Gazette, January 22, 1935
General Duties Branch

The following Flight Cadets, having successfully passed through the Royal Air Force College, Cranwell, are granted permanent commissions as Pilot Officers with effect from and with seny. of Dec. 15, 1934:—H. C. Vickery, H. M. Styles, L. C. Bicknell, D. F. Dixon, J. K. L. Carstairs, E. M. T. Howell, D. H. S. Rusher, E. L. F. Mevnell, F. M. Smith, L. Rose, A. J. Whillier, G. J. Wright, H. R. Coventry, H. D. Fraser, I. C. Jackson, D. B. Hatfield, D. H. Lee, B. A. C. Wood, J. R. Stephenson, R. D. A. Wills, J. L. Crosbie, H. C. Sawyer.

Lt. Cdr. S. Richardson, R.N., is granted a temporary commission as Flight Lieutenant, with effect from Jan. 7 and seny. of July 1, 1927; Pilot Officer on probation C. L. Gomm is confirmed in rank (Jan. 1).

The following Flying Officers are promoted to the rank of Flight Lieutenant:—L. R. S. Freestone (Dec. 17, 1934); J. T. Mynors, G. Bearne, I. A. Critchley (Dec. 28, 1934).

F/O E. C. W. Smith is promoted to the rank of Flight Lieutenant with effect from Jan. 15 and with seny. of Dec. 17, 1934; Sqn. Ldr. L. N. Hollinghurst, O.B.E., D.F.C., is granted the acting rank of Wing Commander (unpaid) with effect from Jan. 11, while appointed to the directing staff of the R.A.F. Staff College; Sqn. Ldr. C. E. V. Porter is placed on the half-pay list, scale B, from Dec. 30, 1934, to Jan. 7 inclusive; Cdr. E. M. C. Abel-Smith, R.N., Squadron Leader.

R.A.F., ceases to be attached to the R.A.F. with effect from May 14, 1934, on return to Naval duty, and is re-attached to the R.A.F. as a Squadron Leader, with effect from July 28, 1934, and with seny. of Jan. 1, 1933; Cdr. E. M. C. Abel-Smith, R.N., Squadron Leader, R.A.F., ceases to be attached to the R.A.F. on return to Naval duty, Aug. 28, 1934; Flt. Lt. A. J. Holmes is transferred to the Reserve, Class A (Jan. 17); Lt. P. W. Humphreys, R.N., Flying Officer, R.A.F., relinquishes his temporary commission on return to Naval duty (Jan. 7).

Medical Branch

Flt. Lt. D. C. Macgilchrist, M.B., Ch.B., is transferred to the Reserve, Class D (Jan. 18).

Erratum

In the *Gazette* of Nov. 13, 1934, notification concerning Lt. S. W. D. Colls, R.N., Flight Lieutenant, R.A.F., for Oct. 28, 1934, read Oct. 29, 1934.

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers
General Duties Branch

The following Flying Officers are transferred from Class A to Class C:—T. O'N. East (July 11, 1934); E. L. Brackenbury (Jan. 9); J. F. Nicholas (Jan. 11).

The following Flying Officers relinquish their commissions on completion of service and are permitted to retain their rank:—B. P. Jones (Jan. 4); P. B. Chubb (Jan. 6).

SPECIAL RESERVE

General Duties Branch

The following Pilot Officers on probation are confirmed in rank:—

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Squadron Leaders.—E. D. Davis, to Aeroplane and Armament Experimental Establishment, Martlesham Heath, 14.1.35; for Armament duties vice Sqn. Ldr. G. A. H. Pidcock. (Acting Wing Cdr.) L. N. Hollinghurst, O.B.E., D.F.C., to R.A.F. Staff College, Andover, 11.1.35; for duty as Instructor vice Sqn. Ldr. (Acting Wing Cdr.) A. L. Fiddament, D.F.C. C. E. V. Porter, to Royal Air Force College, Cranwell, 8.1.35; for flying duties. (Acting Wing Cdr.) R. W. Chappell, M.C., to Special Duty List, 6.1.35; on appointment as Air Attaché, Tokio. S. D. MacDonald, D.F.C., and T. M. Williams, M.C., D.F.C., to Royal Air Force Staff College, Andover, on 21.1.35; for Staff Course No. 13. R. H. Hammer, M.C., to No. 802 (F.F.) Squadron, 15.1.35; to command.

Flight Lieutenants.—E. D. Elliott, to No. 825 (F.S.R.) Squadron, 11.1.35. E. D. Barnes, A.F.C., L. K. Barnes, J. N. Boothman, A.F.C., G. P. H. Carter, R. H. Carter, C. J. Collingwood, D.F.C., A. D. Davies, E. S. C. Davis, G. Harcourt-Smith, J. D. I. Hardman, D.F.C., V. Harris, E. A. Healy, F. W. Long, G. H. Mills, G. E. Nicholletts, A.F.C., L. F. Pendred, M.B.E., D.F.C., N. A. P. Pritchett, J. W. Turton Jones, all to Royal Air Force Staff College, Andover, on 21.1.35; for Staff Course No. 13. H. L. Beatty, to No. 203 (F.B.) Squadron, Basrah, Iraq, 15.1.35. R. W. Hill, to No. 230 (F.B.) Squadron, Pembroke Dock, 16.1.35.

Flying Officers.—C. Griffiths, to No. 812 (F.T.B.) Squadron, 11.1.35. H. Harkness, to School of Naval Co-operation, Lee-on-the-Solent, 6.1.35. D. M. Somerville, to Station Headquarters, Farnborough, 1.1.35. E. R. Berry, to Air Armament School, Eastchurch, 14.1.35. F. W. H. Gee, to Station Headquarters, Manston, 12.1.35. I. V. Hue-Williams, to No. 2 Flying Training School, Digby, 12.1.35. G. E. MacDonald, to No. 802 (F.F.) Squadron, 14.1.35. B. S. Nicholl, to Air Pilotage School, Andover, 17.1.35.

Pilot Officers.—L. G. Levis, to No. 825 (F.S.R.) Squadron, 11.1.35. G. A. Mills, to No. 825 (F.S.R.) Squadron, 11.1.35. G. A. M. Pryde, to No. 825 (F.S.R.) Squadron, 11.1.35. J. A. Scott, to No. 825 (F.S.R.) Squadron, 11.1.35. M. D. Thunder, to No. 205 (F.B.) Squadron, Singapore, 15.1.35.

Acting Pilot Officers.—The following Acting Pilot Officers are posted to R.A.F. Depot, Uxbridge, on 16.1.35; on appointment to Short Service Commissions:—H. L. I. Brown, G. J. Bush, H. D.

H. F. Remnant (December 8, 1934); F. F. Essam (December 14, 1934).

AUXILIARY AIR FORCE

General Duties Branch

No. 600 (CITY OF LONDON) (FIGHTER) SQUADRON.—P/O. P. K. Devitt is promoted to the rank of Flying Officer (Jan. 13).

No. 605 (COUNTY OF WARWICK) (BOMBER) SQUADRON.—P/O. A. G. Dennison is promoted to the rank of Flying Officer (Dec. 29, 1934).

Cooke, D. Davies, R. T. F. Gates, W. I. Hammond, J. E. Jacobs, J. C. McG. Lunn, R. E. X. Mack, R. B. Nuthall, G. Packe, V. A. Pope, W. Townson, R. C. Waddell.

Stores Branch

Squadron Leader.—A. W. Smith, to Aircraft Depot, Iraq, Hinaidi, 11.1.35; for Stores duties vice Sqn. Ldr. W. J. King.

Flight Lieutenants.—R. N. Hesketh, to No. 216 (B.T.) Squadron, Heliopolis, Egypt, 5.1.35. W. A. D. Collingwood and H. W. Penney, to Royal Air Force Staff College, Andover, on 21.1.35; for Staff Course No. 13.

Flying Officer.—R. G. Seymour, to No. 16 (Army Co-operation) Squadron, Old Sarum, 14.1.35.

Accountant Branch

Wing Commander.—W. G. W. Prall, to Headquarters, Western Area, Andover, 6.1.35; for Accountant duties vice Sqn. Ldr. H. G. Bushell.

Squadron Leaders.—H. G. Bushell, to Station Headquarters, Andover, 13.1.35; for Accountant duties vice Flt. Lt. J. P. Cave. W. E. Fisher, M.C., to No. 1 Air Defence Group Headquarters, 18.1.35; for Accountant duties vice Sqn. Ldr. R. Whyte.

Flight Lieutenants.—J. R. Ackers, to No. 4 (Army Co-operation) Squadron, South Farnborough, 16.1.35. J. P. Cave, to Station Headquarters, Boscombe Down, 18.1.35.

Chaplains Branch

Rev. C. R. Richardson, to Headquarters, R.A.F., Mediterranean, 11.1.35; for duty as Chaplain (C. of E.) vice Rev. A. R. A. Watson.

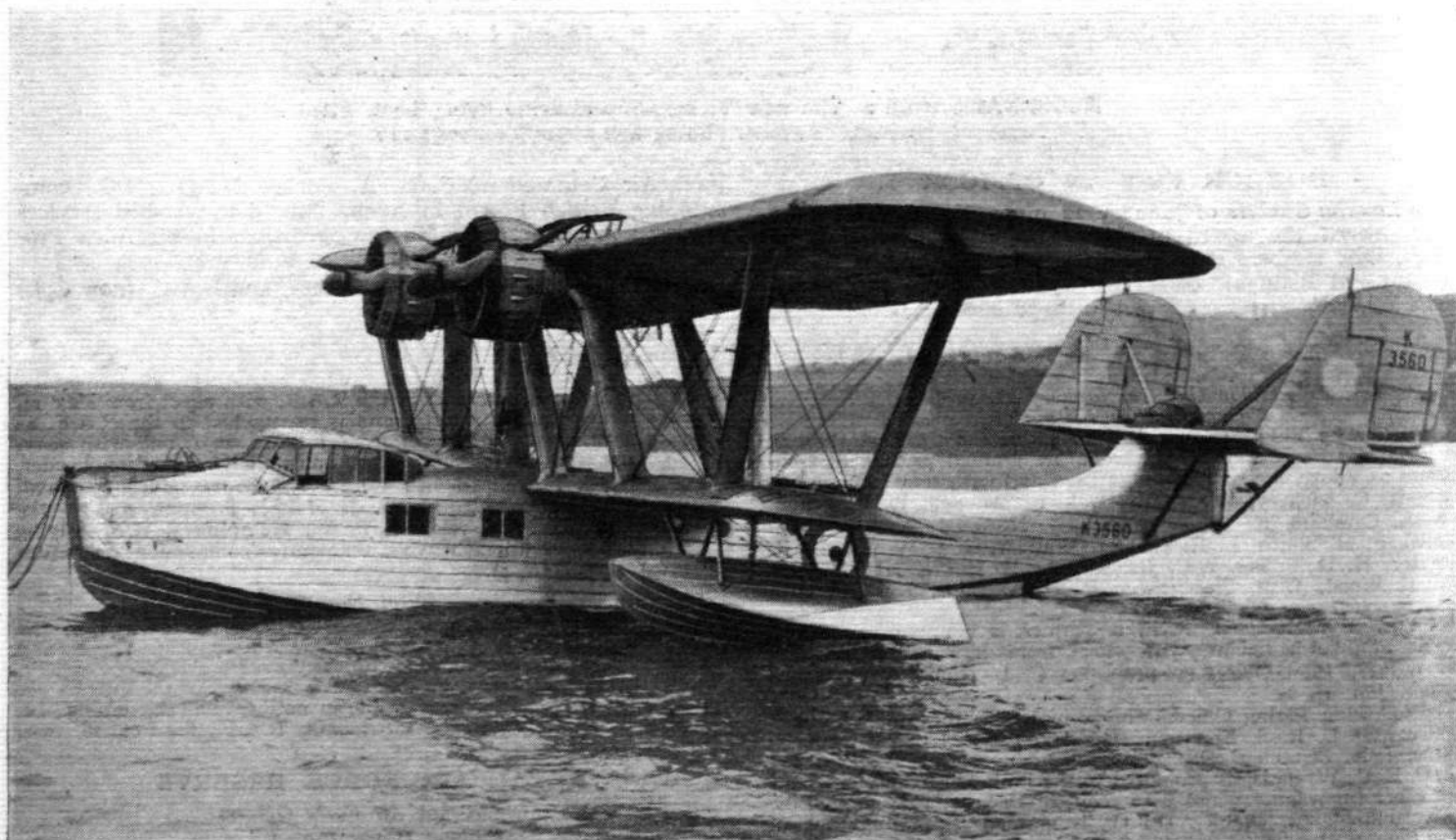
Medical Branch

Flight Lieutenant.—A. E. Vawser, to Home Aircraft Depot, Henlow, 1.2.35.

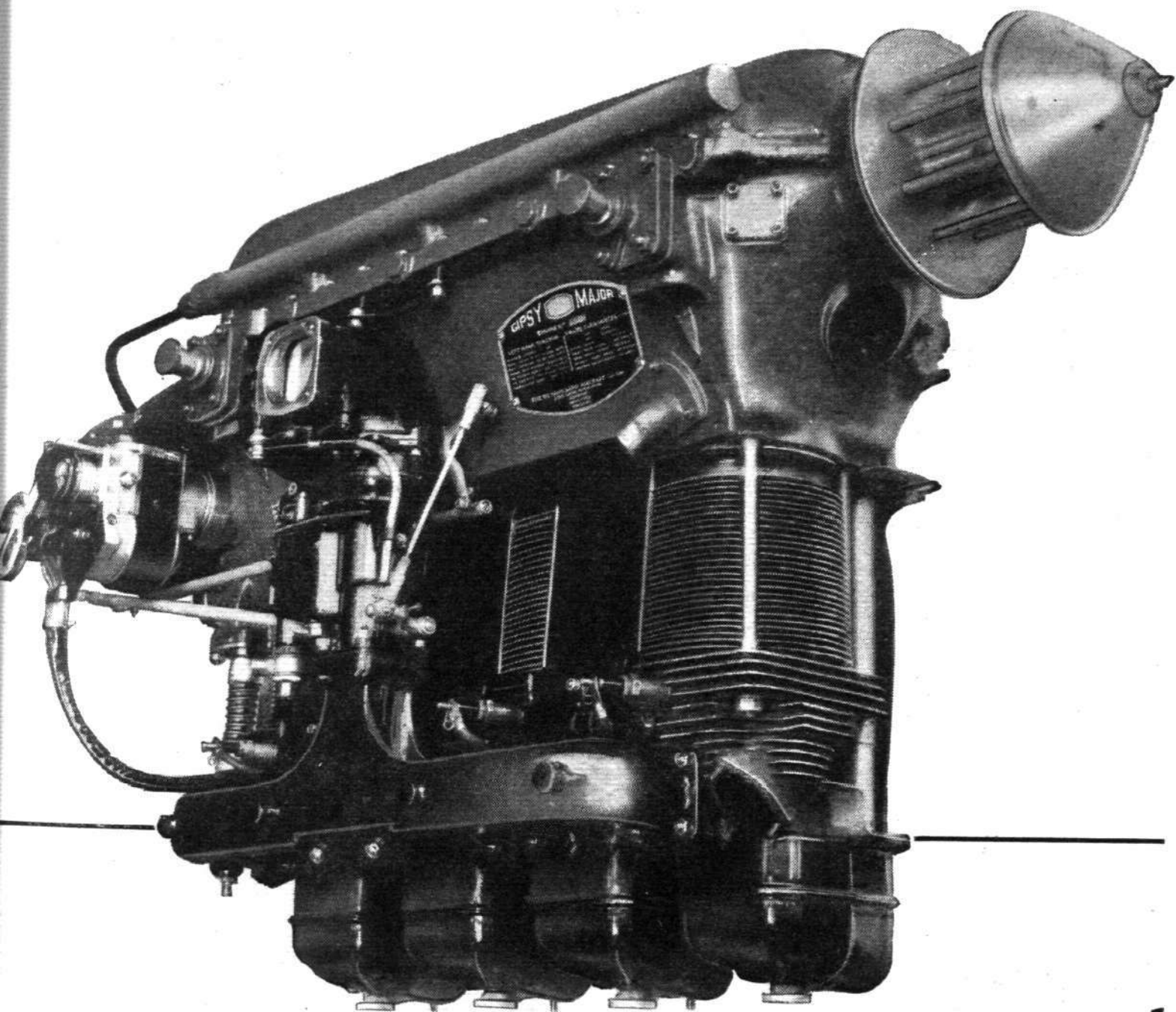
Flying Officers.—The following Flying Officers are Posted to Medical Training Depot, Halton, on 7.1.35, on appointment to Short Service Commissions:—R. G. James, C. A. Lewis, J. W. Patrick, W. G. S. Roberts, A. W. Smith, G. H. Stuart, J. S. Wilson.

Dental Branch

Flying Officer.—A. Maben, to Medical Training Depot, Halton, 7.1.35; on appointment to a non-permanent Commission.

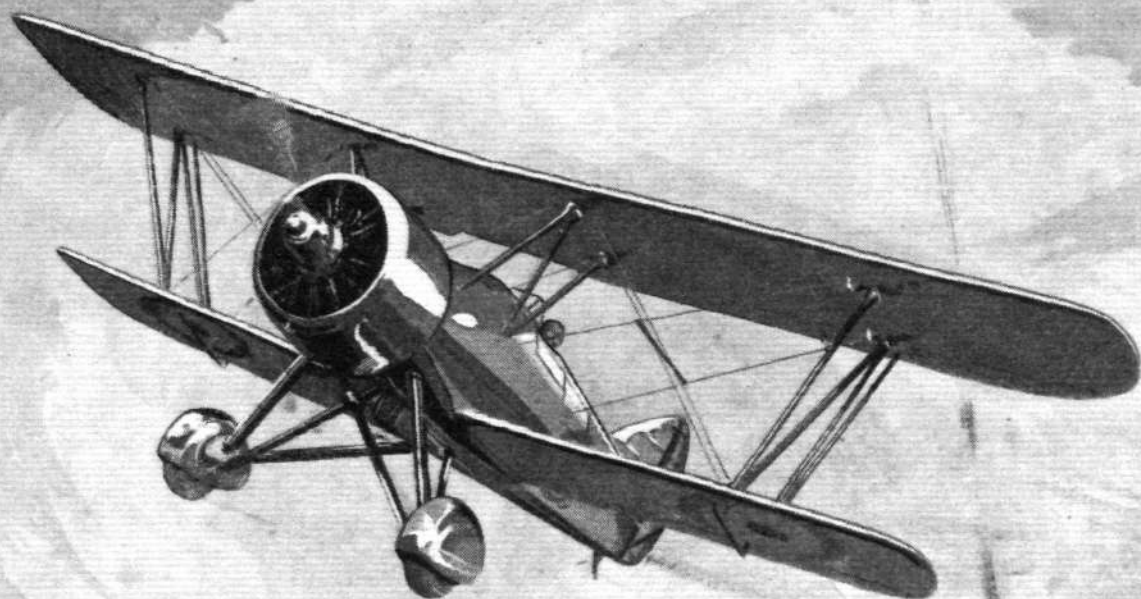


ANOTHER OPEN-SEA RECONNAISSANCE TYPE: The Saunders-Roe R24/31 (two Bristol "Pegasus" engines), in which the A.O.C. Coastal Area recently flew to Pembroke Dock for the start of the Singapore flight. (Flight photograph)



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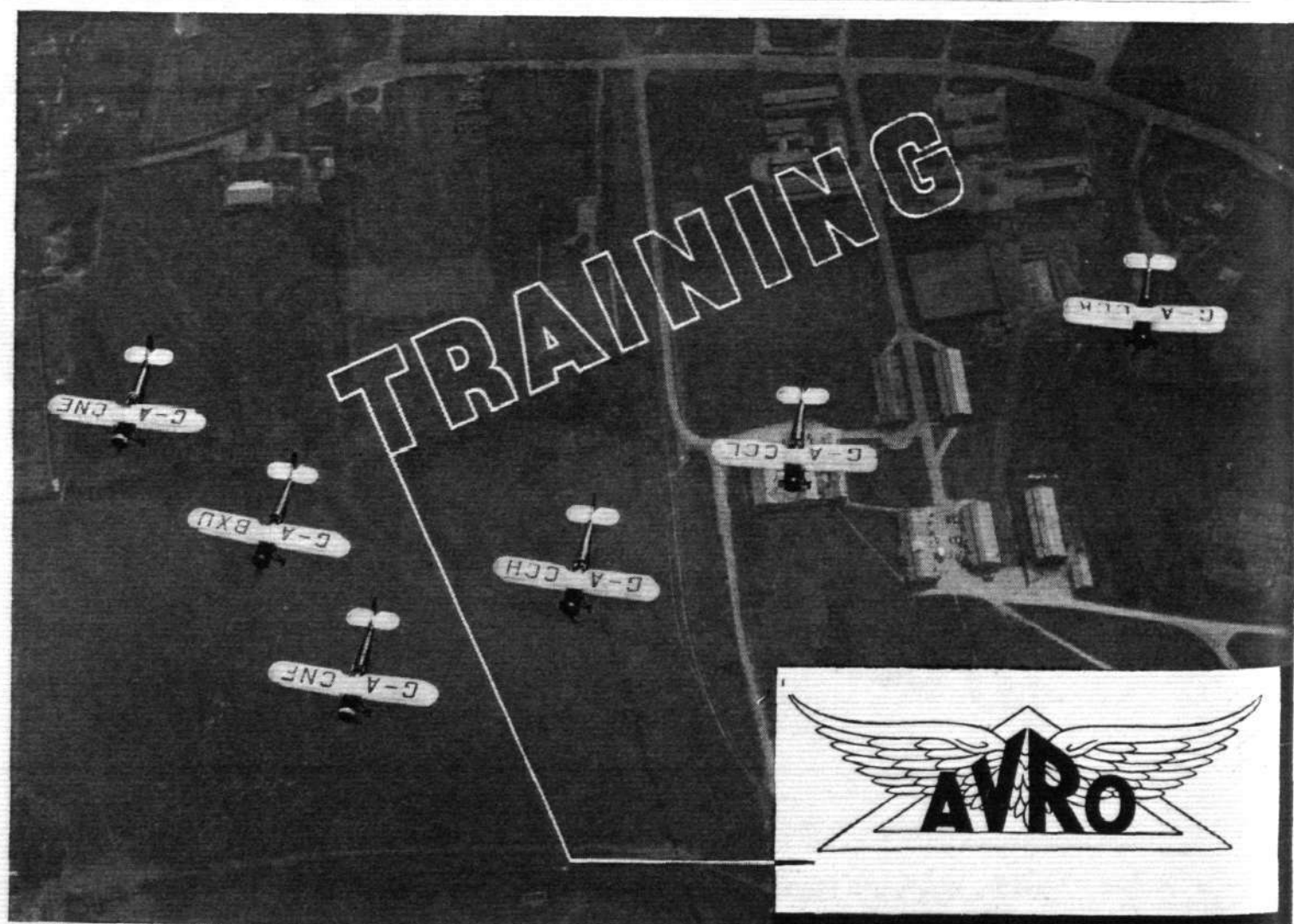


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PRIVATE FLYING

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CONTINUES HIS DESCRIPTION OF
CONDITIONS ENCOUNTERED DURING
HIS WORLD FLIGHT : THE IDEAL
MACHINE FOR THE PRIVATE OWNER
IN INDIA

WITH the progress of commercial aviation in India and the growing popularity of club flying, it is not surprising that protagonists should arise urging the development of motorless flying. There is every reason to hope that gliding and soaring will play an important part in increasing airmindedness amongst the Indian people, for not only are the conditions likely to be very favourable but the relative economy with which motorless flying can be practised should appeal to a large section of the community who cannot afford to take up power flying.

The flying clubs themselves have much to gain from the development of gliding, which will bring in its train a wider knowledge of the design and construction of aircraft suitable for the peculiar circumstances met with in India. At the present time the cost and maintenance of aeroplanes and equipment for training is a problem for those responsible for the running of the clubs, for it has in many cases been necessary to provide flying at a figure which, even with the subsidy given by the Government, has resulted in an annual operating loss. For this reason there is likely to be a growing demand, at least for purposes of *ab initio* training, for a type of aeroplane of low horse-power, such as has been developed in Europe from experience gained in the construction of gliding and soaring machines. Meteorologists, and others who have had the opportunity of so doing, have given us a good deal of information gained from their observation of bird flight in India, and particularly of soaring kinds. The prevalence of the latter type demonstrates the peculiar suitability of conditions, and the aptitude shown by the birds in utilising thermal currents to cover long distances is an indication that exponents of motorless flying would find conditions particularly suitable.

Strong Vertical Currents

THE possibilities of long-distance motorless flying in India, where strong vertical air currents commonly develop within fifty feet of the ground, opens up a fascinating study. The effortless soaring of different kinds of birds, each variety appearing to choose its own time to flap up through the intervening space until these convection currents are reached, continues throughout the day. In the same circumstances there would appear to be no reason why sailplanes launched even from level ground should not emulate the birds.

Realising these peculiarly favourable conditions, the International Commission for the Study of Motorless Flight urged in 1931 the desirability of arranging for fully qualified soaring pilots to undertake experimental flights in India with a view to determining how far performances in temperate regions could be improved upon in tropical zones. Following on this suggestion, Herr Kronfeld—one of the most experienced pilots in the world, who had flown in many countries under varying conditions—got into touch with the Indian authorities with a view to the possibility of visiting India for this purpose. The Government referred him to the Indian Gliding Association, who, after consultation with the Meteorological Department, which indicated that February-May would be the most suitable period, tried to raise the necessary funds to finance the

Conditions in India

visit, but, owing to lack of public support, the project fell through.

The native princes might well follow the example of the Ruler of Aundh, who has done so much to help the Indian Gliding Association.

There is much that could be written of the possibilities of aviation in India. As in other countries, there is a great need for more aerodromes as a preliminary requirement to expansion and for greater facilities for servicing such types of aircraft as are used in India. At the present time only one British manufacturer has established a branch at which spares can be obtained. The time is coming, if it has not already arrived, when manufacturers might, with advantage, arrange for demonstration flights of aircraft of improved design. Before this is done the peculiar conditions and requirements must be closely studied, for special types are required to suit varying needs. Owing to the greater distances between important centres, aircraft of fairly high performance with a good range are desirable.

The Ideal Machine

PRIVATE owners of the future who wish to travel much in India will require a machine with a cruising speed of around 140-150 m.p.h. This should have an enclosed cabin with plenty of luggage space, and, if a monoplane, should preferably be of high-wing design, as in this type the cabin is kept cooler by being shaded by the wing. Particular attention must, of course, be paid to ventilation, and where the cabin has a top light a properly designed sunblind is necessary. Three- or four-seater machines with these characteristics should find a market in India.

The future requirements of the Indian Princes and their State officials open up a potential market, as the example set by one or two enthusiastic State rulers will be followed by many others when the convenience and time-saving of modern air transport is fully realised. Machines of similar design, but having two engines and a larger seating capacity, should be in demand, and as the question of first cost would not necessarily be so important in this particular field, it would be desirable to concentrate on providing every comfort and convenience. The British aviation industry must see to it that every attention is paid to the requirements of the Indian market, which, if properly catered for, will provide an increasing outlet for their products.

Benefits of the Future

THE British community of India have a great deal to gain from the acceleration of commercial air transport. With the new schedules now visualised, when the Mother Country will be reached by air in two or three days, not only will business be facilitated, but the possibility of spending an annual leave in England should do much for the health of those who are keeping up British prestige in India. A few weeks spent annually in a colder climate, which is a prospect which will be opened up to an increasing number of civil servants and others, will help to build up a new store of energy resulting in greater efficiency. With the more arduous conditions imposed by the speeding up of modern life, this advantage is not the least of the many benefits our great Indian Empire may derive from aviation.

Private Flying**FROM THE CLUBS***Events and Activity at the Clubs and Schools***YORK COUNTY**

P/O. H. S. Wilson, who has just completed five years in the R.A.F., has taken up his duties as instructor with the York County Aviation Club, Ltd.

RENFREW

During December the Scottish Flying Club, Ltd., did 59 hours' flying. This is considerably below the corresponding figure for the previous year, but it should be noted that on six days last month flying was quite impossible. Two first solos were made. This has never previously happened in December of any year.

MIDLAND

Flying times for the fortnight ended January 24 were: Solo 11.45 and dual 13.45 hr. A formation flew to Coventry on the occasion of the opening of the Coventry Aviation Group. The monthly dance in the clubhouse was a great success, and the lecture on map reading was well attended. Another talk on aircraft instruments is to be given at 8 p.m. on Tuesday, February 12.

CAMBRIDGE

Flying times for week ended January 25 at Marshall's Flying School and the Cambridge Aero Club were: Dual 27 hr. 10 min. and solo 8 hr. 15 min. Mrs. Marshall passed her "A" licence tests on Wednesday, and several soloists are practising hard for theirs.

Eight members of the Civil Aviation Service Corps arrived on January 20 and put in more than six hours' flying.

BRISTOL AND WESSEX

Mr. I. S. Jenks made his first solo flight last week, and one new member joined—Miss E. Ellis.

The Bristol and Wessex Aeroplane Club played two squash matches during the week against the Bristol Aeroplane Company's Flying School. The first, played at the Bristol Airport, was won by the Bristol Aeroplane Company by 4 ties to 1, and the second match played at Filton was won for the club by 5 ties to 0. A third deciding match is to be played at the Airport on February 6.

LANCASHIRE

December's flying time was almost double that for the same month last year.

During the month an "A" licence was obtained by Mr. Whitworth, and "B" licences by Messrs. G. P. Moss and R. E. Lowe. A conventional first solo was made by Mr. J. C. Grunnert, and one of the Autogiroptic kind by Mr. A. E. Gotch. The Senior Pemberton and Rodman landing competition was won by Mr. J. Hooson, from Canada, and the Junior by Mr. T. E. O'Donnell.

NOTTINGHAM

Since the change of management in March, 1934, the Nottingham Flying Club has made great strides. The total membership is now 280, of which flying members number 88; this is an increase of 380 per cent. since the change over. Eight hundred and fifty hours were flown in the last nine months of 1934—again showing an increase of 66 per cent. over the corresponding period of 1933.

The social side has been a great success, mainly due to the interest taken by members, and to the work of Mrs. Hall.

The clubhouse is being extended by adding three bedrooms and by enlarging the lounge and bar. The latest addition to the fleet is a "Major Moth."

BROOKLANDS

Flying hours last week at Brooklands improved somewhat, the total being 35 hr. 20 min., of which 21 hr. 40 min. were dual and 13 hr. 40 min. were solo. A first solo was made by Mr. P. Vaillant, and Mr. Sorapure completed the tests for his "A" licence.

A very successful landing competition was held on Sunday, January 20, and this was won by Messrs. R. Morris, Mainwaring, and Capt. E. F. Walter. These made the team to compete against Reading in the return competition.

The sales department have broken all previous records in that since Christmas they have sold three "Leopard Moths," one "Dragon," one Klemm, one Miles "Falcon," and four second-hand "Moths."

WITNEY AND OXFORD

Wind stopped flying on two days of the week, the flying returns for which show 5 hr. dual and 4 hr. 20 min. solo. Mr. P. E. Lawrie made his first solo flight, and Mr. C. W. Lyle joined as a pilot-member.

CINQUE PORTS

In spite of gales the flying times last week were well up on the previous week's. They totalled nineteen hours. Apparently members are just recovering from Christmas and the New Year! Mr. W. E. Davis, the manager, will return this week together with his wife from their holiday in Cairo. Ken Waller is flying down to Marseilles in their "Leopard Moth" to collect them from their boat and bring them back to Lympne.

HANWORTH

Mr. M. E. Hearn, who was coached at Hanworth, successfully passed the examination for an instructor's licence at Hatfield last week. Mr. Wood, pilot to Mr. C. R. Anson, made two cross-country flights in his D.H.89. One was to Belfast and one to Stoke-on-Trent, the return speeds on both occasions being almost a record.

Mr. J. Pooley, late R.F.C. and R.A.F., has taken up duties as general manager to the Aircraft Exchange and Mart, Ltd.

HATFIELD

New members of the London Aeroplane Club include Messrs. J. C. Burge and J. R. Ayling. Mr. J. Gourlay has made his first solo flight, and Mr. D. J. A. Fletcher has completed the tests for his "A" licence. Flying time amounted to 53 hr. 40 min.

In spite of inclement weather the R.A.F. Flying Club has managed to put in 6 hr. 5 min. flying during the week. The first club dinner has been fixed for Friday, February 15, and is to be held at the R.A.F. Club in Piccadilly.

READING

Amongst the week-end visitors to Reading Aerodrome who witnessed a demonstration by Mr. F. G. Miles in the latest edition of the Miles "Falcon," were several well-known private owners.

Recently qualified for their "A" licences at the Phillips and Powis School of Flying are the following: Mr. Robello (of Portugal), Miss Diana Caldwell, Mr. A. Smith, and Mr. Dawson, who is an apprentice at Phillips and Powis, Ltd. Mr. W. Ardell, late of the Everson Flying School, Dublin, has joined the school at Woodley.

SOUTHEND

The total hours flown by the Southend Club during the past year show a considerable increase over the figure for the previous year, and despite the winter conditions the two Avro "Cadets" are fully occupied, and the return of the "Moth" from its C. of A. will be welcomed.

Three more pupils, Messrs. Stevens, Harborough and Mathieson, have passed their "A" tests. Miss Rankin, the first lady member to go solo—after only six hours' instruction—will shortly be taking her tests, and Mr. Jones has made a first solo.

The club has only two and a half months to run on the present aerodrome, after which they will move to the new Southend Municipal Aerodrome.

NORFOLK AND NORWICH

The weather discouraged flying during the week-end, but a number of hours were put in by members during the early part of last week. During the week-end Mr. A. J. S. Morris flew Mr. Alan Colman's "Leopard Moth" to Cowes. Both came back in the machine, and owing to bad weather had to land at Bury St. Edmunds. Last Wednesday Mr. J. Collier, the instructor, returned from Reading aerodrome with Mr. M. E. King, having completed a blind-flying course.

In about a fortnight's time the club will hold a debate in the clubhouse. The subject will be "That record-breaking flights are justifiable," and the motion will be supported by Mr. A. J. S. Morris.

It is probable that Viscount Elmley and Mr. Ken Waller will be among the guests attending the Annual Dinner on March 29.

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COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —

CROYDON

Those Newspapers Again : A Passport Chases Its Owner : Zone Control Delays : Spoiling the Approaches

THE gale at the end of last week gave the newspapers a fresh opportunity of misleading the public about air transport. In order to round off a story about an inconsiderable number of cancellations, and of a machine or so which put back to port, at least one evening paper gave the public the impression that services from France, Belgium and Holland were held up. This was not so in the case of Holland, as both K.L.M. and D.L.H. operated all services on the Friday and, moreover, Malmö, Copenhagen and Berlin services ran as usual despite the long distances.

The wind force at 5,000 ft. at Croydon was given as 66 m.p.h. and as 62 m.p.h. at ground level. There is obviously nothing about such a wind to prevent reasonably fast commercial aeroplanes flying as usual. I know of one definite case of a cancelled passage on the Saturday morning due to alarming and exaggerated newspaper stories. The passenger was a foreigner with a pathetic faith in the veracity of English newspapers.

Air Taxis, Ltd., of Croydon, had an unusual job—that of conveying a passport to Dover for a boat-train passenger who had left it behind. The pilot, Capt. Crundall, did the flight in 35 minutes, thus beating the train. He was able to hand the passenger his passport as he stepped from his carriage.

The fog control system, whereby aeroplanes may not start if other traffic is approaching in such volume as to be dangerous, gave rise to a problem of a serious nature last week when an Imperial machine outward bound was held up for about 1½ hours. In proportion to journey time such a delay is preposterous, though where purely local traffic is involved it may be justified. What, however, will be the position of an aeroplane connecting with various long-distance machines in Amsterdam or Paris if held up by incoming traffic so long as to lose connections to places such as Marseilles, Malmö, Milan and Vienna? It is obvious that incoming aeroplanes cannot

always have right of way in future, but that the outgoing machine's importance to air traffic must be considered.

More than one record was broken last week, thanks to high winds. On Friday, January 25, Pilot Both, of K.L.M., with a Fokker F.12, flew from London to Rotterdam in 62 min., the previous best being 68 min., and on Saturday, Pilot Bart, of Air France, flew London-Paris in 67 min. with a Wibault.

Somebody is erecting a fine tall house on the highest bit of ground at the top of Purley Way at a point much used by incoming aircraft. Most municipal airports and privately owned ones have things so arranged that building on the edge of the landing area is strictly controlled and no tall buildings may be erected. So far as can be ascertained there is nothing to prevent a row of skyscrapers being built on the edge of the airport of London. The authorities have owned the aerodrome for many years, and such lack of foresight seems incredible.

I was surprised to see a remark in a newspaper recently that quite a number of regular airline passengers "revert to surface transport at this time of year." This is not the experience of air traffic companies regarding regular passengers and those holding season tickets. There may be those who prefer a yellow world of fog, long delays outside Channel ports, and the music of fog-horns to flying above fleecy white clouds in bright sunshine, but they are not the regular air travellers.

Another newspaper article last week was amusing. Somebody ventured to write of Croydon that the pilots' room, full of caricatures of British pilots, was a sort of club sacred to British pilots alone. It is, of course, open to all pilots and aerodrome employees of all nations, and about half the caricatures are of foreign pilots and others connected with the Airport. They are drawn by an amateur—with professional skill.

A. VIATOR.

Air France News

The Dewoitine "Antares," described in *Flight* of January 3, has made successful test flights at Toulouse.

According to plans made last year the South American mail has, since January, been flown out to the island of Noronha, 300 miles off the Brazilian coast. Las Palmas (Canaries) is used as the African "jetty."

New Brazilian Airway

Pan American Airways have recently completed the survey of a new inland route between Para and Rio de Janeiro. A Sikorsky amphibian, piloted by Capt. H. L. Turner and in charge of Mr. K. M. Blotner, the Brazilian operations manager, was used for the trip.

Incidentally, P.A.A. have recently put three Douglas D.C.2s into service between Antofagasta and Buenos Aires.

Chilean Developments

Owing to the increasing volume of traffic the Chilean National Air Line is now putting three services weekly on the passenger and mail route between Santiago and the Peruvian frontier. The distance of the run is 1,150 miles. The company is considering the purchase of two or more high-speed aeroplanes.



AMERICAN LUXURY FOR THE EAST. A Boeing 247-D, with this special interior, has been delivered to Marshal Chang Hsueh Liang who is in charge of the Hupeh Province of the Nanking Government.

Commercial Aviation**HESTON***Internal Services Use Ards Airport : A Fine African Flight : Joy-riding With a "Scion" : Second Teeth*

THE Ards airport, which is owned by Airwork, Ltd., of Heston, and which has been troubled by floods, is now busy again, thanks to drainage operations and improved weather. On the morning of January 15, both Railway Air Services and Hillman machines landed at Newtownards owing to thick fog elsewhere. Later in the day the fog spread over the aerodrome, but the incoming Hillman machine left Liverpool in spite of an adverse weather report. When it arrived over the aerodrome the machine was invisible from the ground, and several rockets and Very cartridges were fired to enable the pilot to locate the landing ground. He eventually found a hole in the fog and landed safely. 5,754 lb. of freight from Hillman machines were handled at the airport in the week ended January 20.

Two days after this incident fog was again widespread, and Newtownards was the only clear aerodrome on either side of the water. Lord Londonderry was among the R.A.S. passengers landing at Ards owing to fog at Aldergrove. An R.A.F. pilot brought in a D.H. 86 in a dead calm, and landed in a remarkably small area, proving that these machines do not necessarily require abnormally large spaces.

Flt. Lt. R. W. E. Bryant, Chief Instructor and Manager, carried out a charter flight on January 3 to ensure that the Palace Cinema, Newtownards, should be able to screen the film "It Happened One Night" on the advertised date. The double journey of over 220 miles to Renfrew and back was achieved in less than three hours, including the stop at Renfrew.

Airwork at Manchester carried out a charter flight to Glasgow, with Mr. Pyfe-Robertson, Art Editor of a well-known daily paper, as passenger. Fog forced the aeroplane to land at Dumfries, but the passenger caught a fast train to Glasgow, arriving 2½ hours earlier than if he had made the whole journey from Manchester by train.

The space devoted last week to the new developments at Heston meant that Mr. Whitney Straight's flight to Africa and

back, which finished at Heston on January 13, was not mentioned. Mr. Straight left Heston on December 9 to compete in the South African Grand Prix at East London. Flying a D.H. "Dragon" chartered from Brian Lewis, he made the outward journey in thirteen days, the flying time being 82 hr. 45 min. Among the longer stages of the flight were Heston-Marseilles in 9 hr. 40 min.; Cairo to Khartoum in 10 hr. 45 min.; and Juba to Dodoma in 9 hr. 25 min. At Salisbury, six days before the race, he was threatened with failure, for a wing was torn by a post in taking off. Repairs were completed by the 22nd, and he reached East London the same day after 12 hr. and 45 min. flying from Salisbury, via Bulawayo, Johannesburg and Pietermaritzburg. Mr. Straight won his race, as he deserved, and his brother, who was a passenger on the flight, came in third.

Mr. L. J. Rimmer, of North British Aviation at Hooton, has purchased a Short "Scion" from Brian Lewis. Mr. Rimmer has been joy-riding ever since the war with Avro 504's, and the Short "Scion," besides providing a modern contrast, will be one of the few multi-engined aeroplanes in regular use for joy-riding.

In the course of the past week, pilots of Birkett Air Service delivered four Avro 626 advanced training machines from Manchester to the Belgian Air Force in Brussels.

During the last week Heston has taken on the one-sided grin of a child which has lost the first of its first teeth. The comparison is not so far-fetched as it seems, for Heston is entering its seventh year—about the age when the implements which serve a child for mastication begin to drop out one by one, and to be replaced by the solid grinders of maturity. The depot hangars are no more. Only a few bricks remain in the wide space where, as spring progresses, will grow a gigantic molar with the serrated top surface that characterises its dental counterpart. In the background the concrete mixer is attending to a few minor stoppings, and, to complete the picture, the pneumatic drill will shortly be heard.

K.L.M. Manager's New Appointment

Capt. H. Spry Leverton, Airport Manager K.L.M., Croydon, has been appointed, in addition, to the post of Airport and Airline Superintendent of the K.L.M. North of England lines.

Potez Monoplane for Air France

A fourteen-passenger high-wing monoplane, developed from the Potez 54 *multiplace de combat* type and fitted with two Gnome Rhone "Mistral Major" K.14 engines, has been ordered by Air France. The machine should make its first flight soon. The cruising speed is expected to be 170 m.p.h.

Bringing the Future Nearer

Last Tuesday a joint delegation, from the Air Ministry and the Post Office, left by Imperial Airways for India, Siam, Singapore and Australia. This delegation consisted of Mr. F. G. L. Bertram, Deputy D.C.A.; Mr. T. L. E. Guinness, M.P., Parliamentary Private Secretary to the Under-Secretary for Air; Sir Frederic Williamson, Director of Postal Services; and Sir Edward Campbell, M.P., Parliamentary Private Secretary to the Postmaster-General.

The delegation will discuss ground organisation and the co-ordination of services in preparation for the ambitious speeding-up scheme on the Empire air routes announced by Sir Philip Sassoon on December 20 last year.

Guernsey's Airport

The States of Guernsey were asked on January 30 to approve the report of the Committee on Aviation appointed nine months ago.

The report recommends the acquisition of land in the centre of the island, at present owned by fifty-four different proprietors—some of whom are not willing to sell—and to do so a special Act of Expropriation would need to be passed.

The estimated cost of laying out of an aerodrome, irrespective of the capital value of the land, would be in excess of £80,000, and the States Committee of Agriculture and Fisheries strongly oppose the site in view of the effect on the island's

milk supply if the proposed area of 130 acres is withdrawn from cultivation.

More "Electras" Go Into Service

Thirteen Lockheed "Electras" have been ordered by North-West Airlines to replace the "Orions," Fords, and so on, at present in use on their Chicago-Seattle route, and five of these have already been delivered. Full radio and lighting equipment is being installed on the northern trans-continental route, and the company will eventually duplicate all mail and passenger services.

The Channel Islands Service

The figures for the first year of operation suggest that Jersey Airways, Ltd., will have little difficulty in filling their new D.H.86s or in putting up an even better exhibition of reliability during 1935.

Of the services due to leave Heston, 97 per cent. ran to schedule, while 100 per cent. of those from Portsmouth and Southampton were booked as "regular." In spite of the fact that the Jersey fleet consisted of eight D.H. "Dragons," machines were often chartered during the summer season. Machines leaving Heston were filled, on an average, to 65.5 per cent. of capacity (4.76 passengers per trip), and those leaving Portsmouth and Southampton to 74 per cent. of capacity (5.32 passengers per trip).

Incidentally, negotiations which have been going on for some time between the Great Western and the Southern Railways, Mr. W. L. Thurgood, of Jersey Airways, Ltd., and Whitehall Securities Corporation, Ltd., have been brought to a successful conclusion, with the result that the parties have become jointly interested in the recently formed company known as Channel Islands Airways, Ltd. The new company will have a capital of £150,000, one-third of which is to be held by the two railway companies jointly, the other two parties holding one-third each.

Channel Islands Airways, Ltd., which is the holding company for Jersey Airways and the new Guernsey Airways, will work in conjunction with Railway Air Services, Ltd., and will have the valuable support of the two railway companies.

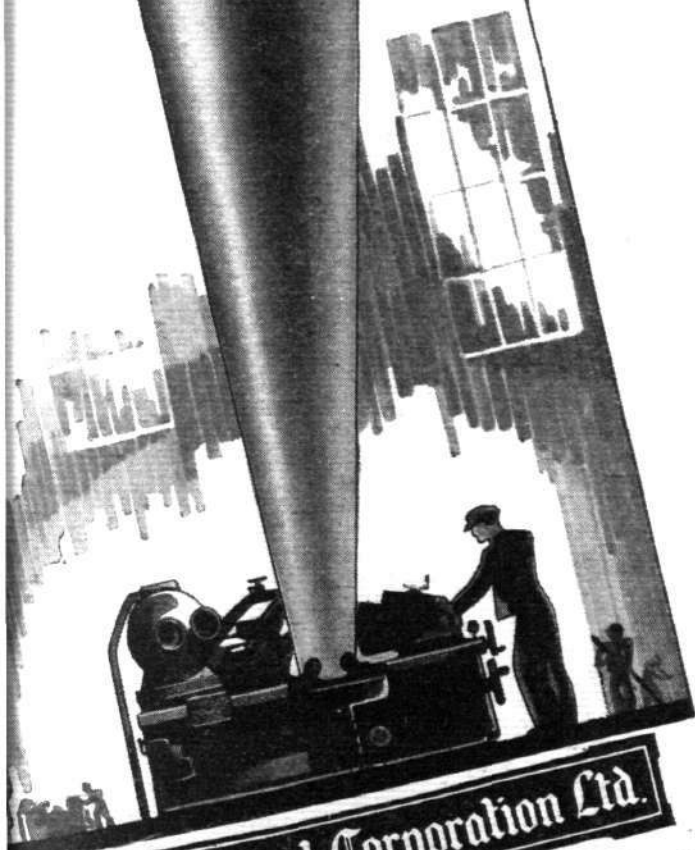
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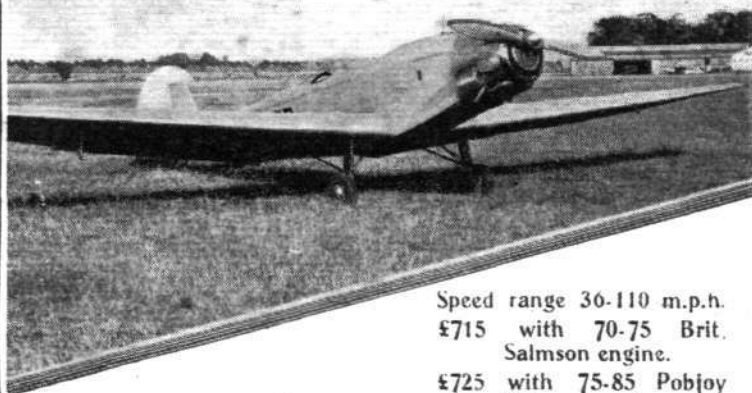
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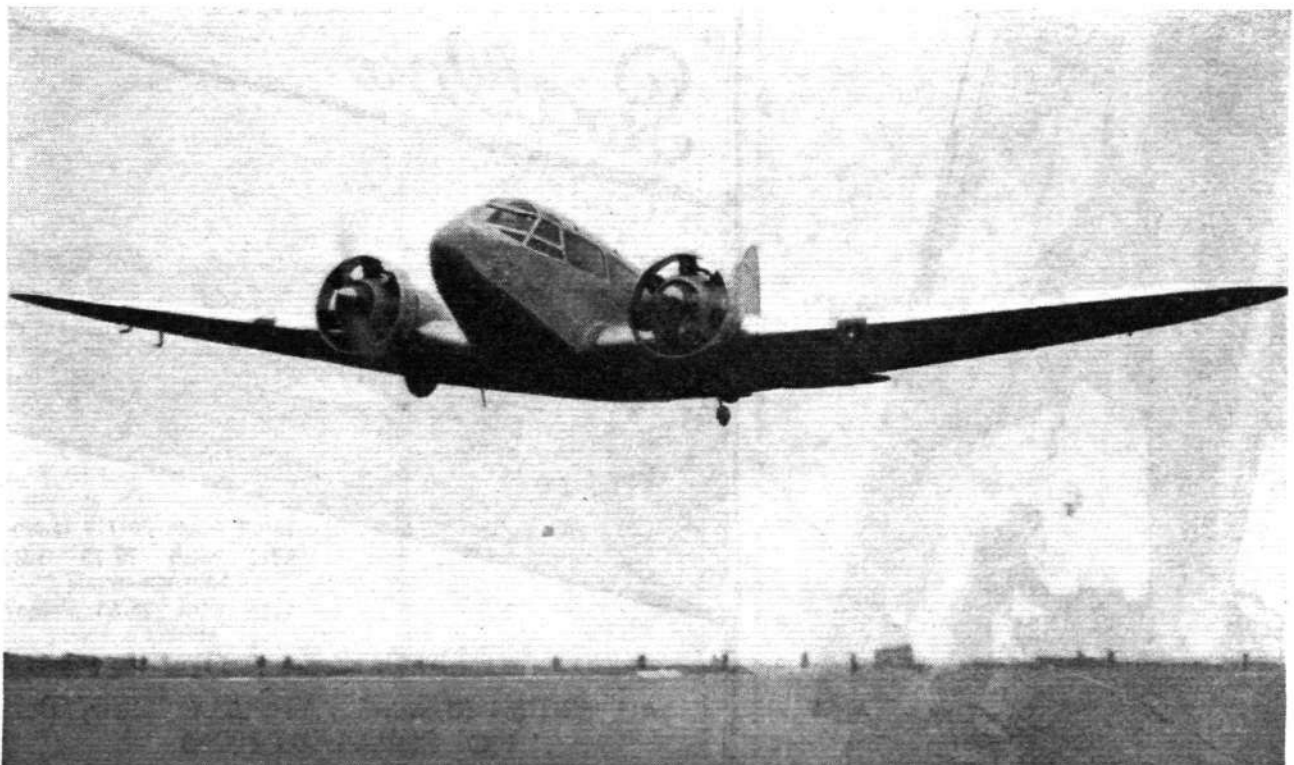
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Southend-Rochester Service

An extension of the existing Southend-Rochester air service up to the East Coast is expected this summer.

Air Mail Money Order Extension

The P.M.G. announces that the Air Mail Money Order service has been extended to Australia. A fee of 1s. 2d., in addition to the normal poundage, will be payable on each order.

The Pacific Project

Pan American Airways have asked the U.S. Navy Department to lay out an aerodrome on Wake Island, in the Pacific, as part of the plan in their projected air service from California to Canton.

Imperial Airways Extensions

During April the London-Cologne service will be extended to Leipzig, Prague, Vienna and Budapest; D.H. 86s (four "Gipsy Sixes") will be used, and the run will be made in each direction every week-day.

The Pan American Fleet

Four examples of the Sikorsky S-42-B, an improved version of the S-42 with H. series "Wasp" engines and Hamilton constant speed airscrews, have been ordered by Pan American Airways. When these are delivered the P.A.A. fleet will include ten long-range boats for international trade routes.

Douglas for Poland

The Polish company, "LOT," which operates, among others, the longest airline in Europe, from Reval (Esthonia) via Riga, Vilna, Warsaw, Bucharest and Sofia to Salonika (1,800 miles), and which, in conjunction with the Deutsche Luft Hansa, runs a service between Berlin and Warsaw, has ordered two Douglas D.C.2s from the Fokker Works. They are to be used on the Berlin-Warsaw route, which is shortly to be extended to Moscow. For some years "LOT" has been using a large number of Fokkers which are built in Poland under licence.

Incidentally, more than sixty-five DC2s have now been delivered. European companies which are using them include K.L.M., O.L.A. (Austria), D.L.H. and Swissair.

Airline Instruments in the U.S.

It is interesting to know that the U.S. Bureau of Air Commerce stipulates that all airline machines must be equipped with: (a) A bank and turn indicator; (b) An instrument that will indicate the degree of bank and the attitude during climb and descent; (c) An instrument that will indicate the amount of turn; (d) An electrically heated pitot tube for the A.S.I.; (e) A rate of climb indicator; (f) At least one sensitive altimeter; and (g) A free air thermometer—in addition to the normal instruments. Instruments a, b and c must have two different sources of energy, at least one of which must be power-driven.

All the new airline regulations, which will be useful to operators in this country, can be found in the December issue of the Air Commerce Bulletin.

Saharan Service

Aircraft stations have been laid out by the Shell Company along the three main air routes across the Sahara, and, in order to complete the chain in the French Sudan, the Niger Colony and French Equatorial Africa, it has been decided to erect stations at Agades, Gao, Niamey, Zinder, Fort Lamy and Fort Archambault.

The great difficulty, of course, is that the Sahara is only open for motor traffic between October and May, and the road from Zinder to Fort Lamy, for instance, is not generally fit for use before January. The only method of installing the equipment was by following the caravan route from Algiers.

After several months of preparation, the convoy of lorries, cars and personnel left Algeria in the first week of November. Everything had to be carried on the lorries, with the exception of the large 1,500-gallon underground tanks, which were shipped to various ports and sent up-country by rail, water and lorry transport. The expedition arrived at Gao on December 4, and at Niamey on the 16th, where the erection of the aviation pump was completed by December 21.

It thus happened that the Shell pump was ready for the "Comet" flight from Brussels to Leopoldville and back, and this was the first time the Niamey station was used.

Singapore-Darwin

The Armstrong "Atalantas" which were chartered by Qantas Empire Airways for operating the Singapore-Darwin section of the Australian service have been withdrawn and D.H. 86s will, from now on, be used. Incidentally, the last mails were carried in the D.H. 86 being delivered by Capt. Youell.

The K.N.I.L.M. During 1934

The provisional returns of the K.N.I.L.M. (Royal Netherlands Indies Airways) for 1934 prove that not only in Europe, but also in the Far East, air traffic is recognised as indispensable. The company carried 17,624 passengers, showing a 35 per cent. increase on 1933. Freight increased from 69 to 74 tons, mail from 53,000 to 61,000 lb.

Traffic on the regular services increased by 26 per cent. The demand for special flights was 31 per cent. higher than in 1933, whereas the number of passengers carried on joy-rides increased by nearly 70 per cent. In December, 1934, the K.N.I.L.M. booked its 100,000th passenger. In 1934 594,321 miles were flown with 100 per cent. regularity of service on the following lines: Batavia-Bandoeng, Batavia-Semarang-Soerabaja, Batavia-Palembang-Singapore, and Batavia-Palembang-Pakanbaroe-Medan.

The Croydon "Flying Dutchman" Mystery Solved?

A few weeks back it was reported that two Dutchmen came to Croydon Airport enquiring if the "Flying Dutchman" "had yet crashed." This they did at about 7.0 p.m. on the evening on which the ill-fated Douglas sent out a last message about midnight, which message indicated that everything was O.K. at that time. Next day (writes "A. Viator") everyone was thinking exclusively of the Douglas tragedy and forgot another "Flying Dutchman"—the K.L.M. *Snip*, which had taken off about 7 p.m. the previous evening from Amsterdam for the Netherlands West Indies. This machine was not on an ordinary flight, and mails only were carried, so extra tanks were fitted, giving a range of about 3,000 miles for the Atlantic crossing.

Since this was a flight of national importance to Holland, the two Dutchmen doubtless knew of the take-off of this heavily loaded machine at about the time of their Croydon enquiry. Very obviously, therefore, it was the *Snip* they referred to as "the Flying Dutchman."

So, like most other "second sight" yarns, this one had a simple and rational explanation after all!

Disentangling the Radio Skein

One or two new points appear in "Notice to Airmen," No. 10, of this year. In last week's Croydon news it was mentioned that the Air Ministry, owing to the limited frequencies available, had asked that transmissions should only be made when absolutely necessary and that full use should be made of the R/T weather reports broadcast from Heston. Where transmitters are already fitted in aircraft not used on regular services, applications for permission to continue using them should be made to the Secretary (Signals Branch), Air Ministry. Pending the completion of further D/F stations, positions can only be given to those machines operating on the London-Continental and Hull-Amsterdam routes, though, in certain circumstances, of course, Newtownards and Barton can assist.

In the latest "Notice to Airmen" dealing with the radio question it was stated that, since January 28, improved D/F facilities have been available for London-Continental machines working on R/T. The change to 900 metres for D/F operation is no longer necessary and bearings given in relation to Pulham or Portsmouth will be available by R/T in addition to those obtainable in relation to Croydon. As a further consequence, it will not be necessary for R/T-equipped aircraft to change to 900 metres for the transmission of distress calls.

These improvements have been made possible by the establishment of a D/F station for R/T, working on 862 metres, at Pulham (already foreshadowed in *Flight*) and by the co-operation of the Portsmouth R/T station. The Lympne R/T equipment will be available in due course, and Portsmouth will then no longer be called on to help.

For the benefit of those readers not accustomed to the symbols, R/T means radio *telephony* and W/T means *wireless telegraphy*, different wavelengths being used. D/F stands for "direction finding."

THE INDUSTRY

TWO NEW MARCONI DEVICES

THE Marconi Company, whose "homing" device has been proved in regular service, has acquired extensive rights for two interesting patents. These are Smith and Meredith's Radio Azimuth as developed by the Royal Aircraft Establishment, Farnborough, and Simon's Radio Range and Direction Finder. The now familiar "homing" device will be developed to provide a visual indication, where this is of advantage. In practice the pilot of an aircraft fitted with such apparatus has only to watch a dial to know whether he is on his course. The needle shows immediately the direction and approximate extent. The Simon Range and Direction Finder is an American invention which does not require special beacons or direction-finding stations on the ground. It gives visually the bearing of any wireless transmitting station in degrees, and, in certain circumstances, an approximate indication of the distance from that station.

A RECORD YEAR

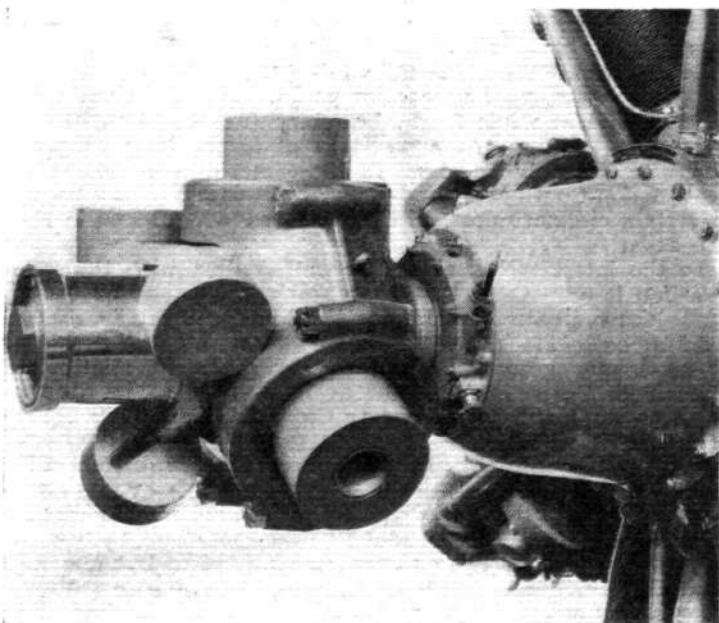
On the occasion of the recent annual dinner of the Williamson Manufacturing Co., Ltd., Mr. Colin Williamson was again able to report a record year, the factory having been working to capacity throughout the year, and so promising was the outlook that the opportunity of acquiring an extension of the premises had been taken, and the new factory was now in course of construction.

THE LIGHTING OF HANGARS

Highly efficient and uniform lighting has been secured in the 500ft. by 80ft. hangar used by the Hawker Aircraft Co., Ltd., at Brooklands, by installing 38 Osram lamps (1,000-watt) in enamelled steel dispersive reflectors. The installation work was done under the supervision of Mr. Fitzroy Woods, A.M.I.E.E., of the Woking Electricity Supply Co., Ltd., and the lamps were, of course, supplied by the General Electric Co., Ltd., of Kingsway, London.

UPKEEP OF AIRCRAFT UPHOLSTERY

A service scheme which should ensure that the upholstery and furnishing of cabin aircraft is kept in the best condition has just been instituted by L. A. Rumbold and Co., Ltd., of Kilburn, London, N.W.6. Under this scheme not only do they replace anything of their own manufacture which proves faulty, but they have a systematic method whereby they keep the interior of the cabin in the best condition. For example, they examine all the chairs, window frames, upholstery, doors, locks, and so on, lubricate all moving parts, replace worn ones, and make sure that everything functions satisfactorily. They also are now using a Noise-meter, and they are in a position to give advice with regard to more efficient cabin silencing when this is required.



STANDARDISED FOR 1935. The latest series of "Pegasus" production engines will be fitted with gear for the operation of Hamilton variable pitch airscrews.

APPROPRIATE

A practical method of illustrating its products and their manufacture has been adopted by Venesta, Ltd., the plywood specialists, who have produced an illustrated desk calendar and diary mounted on a bent plywood base.

AIRSPPEED'S NEW ISSUE

On January 29, Airspeed (1934) Ltd., increased their capital by offering for sale 520,000 preferred ordinary shares of 5s. each at 6s. per share. The new capital will be employed in financing developments made possible by the agreement which has been entered into by the company with Mr. Antony Fokker. This agreement includes an exclusive licence to manufacture aeroplanes to the Fokker design and to sell them within the British Empire; and an exclusive licence to manufacture and sell within the United Kingdom, the Irish Free State, Channel Islands, and Isle of Man during the subsistence of the Dutch Fokker Company's licence from the Douglas Aircraft Corporation, Inc. U.S.A. the Douglas D.C.2 aircraft. The services of Mr. Antony Fokker have also been secured for a period of years as technical advisor to the company.

Mr. Herbert Rothbarth and the Federated Trust and Finance Corporation, Ltd., are underwriting 400,000 of the preferred ordinary shares for an underwriting commission of 4 per cent., and an over-riding commission of 1 per cent., receiving also an option at par upon 120,000 preferred ordinary shares, and the sum of £11,000 in consideration of their discharging the whole of the preliminary expenses of the issue. The Dutch Fokker Co. will receive £20,000 on the execution of the licence and a royalty of £600 for every Douglas D.C.2 manufactured and sold by Airspeed, Ltd., up to a maximum of 20. The Dutch company will be paid a further £20,000 when the total gross sales of aircraft manufactured by the company after date of the licence amount in value to £150,000.

Mr. Fokker, as technical aeronautical advisor for seven years, will receive a commission of 1 per cent. on the gross receipts of the sales turnover. He also receives an option on certain of the preferred ordinary shares



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INCREASES OF CAPITAL

HAWKER AIRCRAFT LTD. (Canbury Park Road, Kingston-on-Thames). The nominal capital has been increased by the addition of £100,000 beyond the registered capital of £800,000. The additional capital is divided into 400,000 "A" ordinary shares of 5/- each.



PUBLICATIONS RECEIVED

Annual Report of No. 603 City of Edinburgh (Bomber) Squadron, 1934. Auxiliary Air Force, Turnhouse, Barnton, Midlothian.
Aluminium Facts and Figures. No. 364. London: The British Aluminium Co. Ltd., King William Street, E.C.4.
Behind the Smoke Screen. By Brigadier-General P.R.C. Groves. Second Impression. Price 5/- net. (First cheap edition.) London: Faber & Faber, Ltd.
A List of English Clubs in all parts of the World for 1935. By E. C. Austen-Leigh. Price 7/6 net. London: Spottiswoode, Ballantyne & Co., Ltd.
Lubrication Research Technical Paper No. 2. A Study of the Boundary Lubricating Value of Mineral Oils of Different Origin. By M. E. Nottage. Price 9d. net. London: H.M. Stationery Office, W.C.2.



AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m = motors. (The numbers in parentheses are those under which the Specification will be printed and abridged, etc.)

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17874. ROWLEDGE, A. J., ELLOR, J. E., AND RUBBRA, A. A. Gearing for Propellers. (421,889)
 34813. FAIREY AVIATION CO., LTD., AND FORSYTH, A. G. Timing mechanism for machine guns on aircraft. (422,085)

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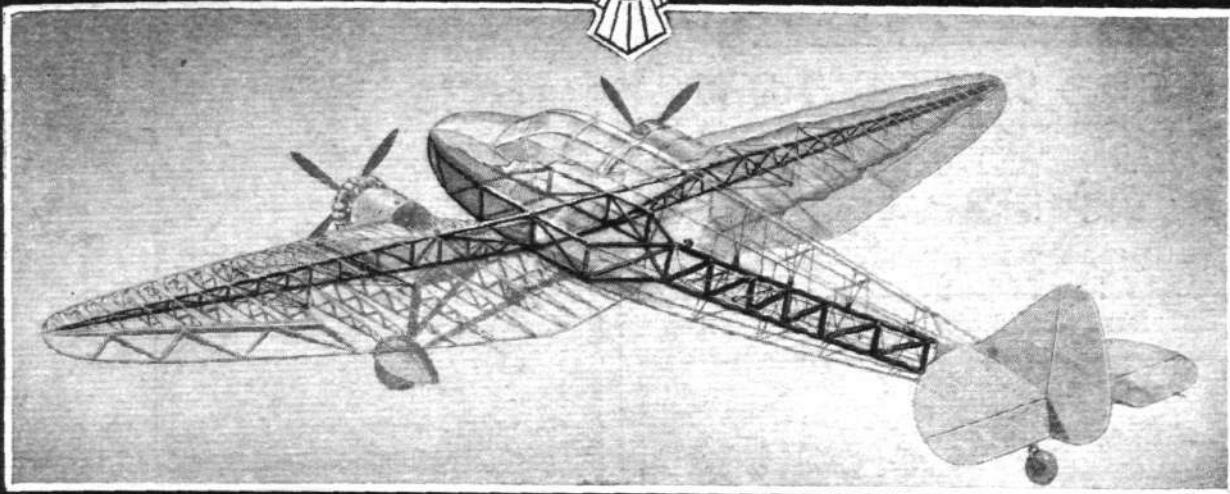
9582. HART, E. P. Wind-direction indicator for aerodromes and analogous situations. (421,870)
 18190. ROSE, L. S. Training and testing device for pilots. (422,104)

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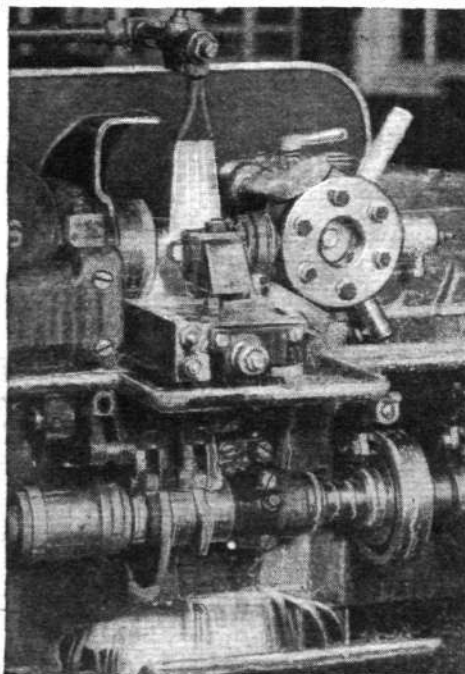
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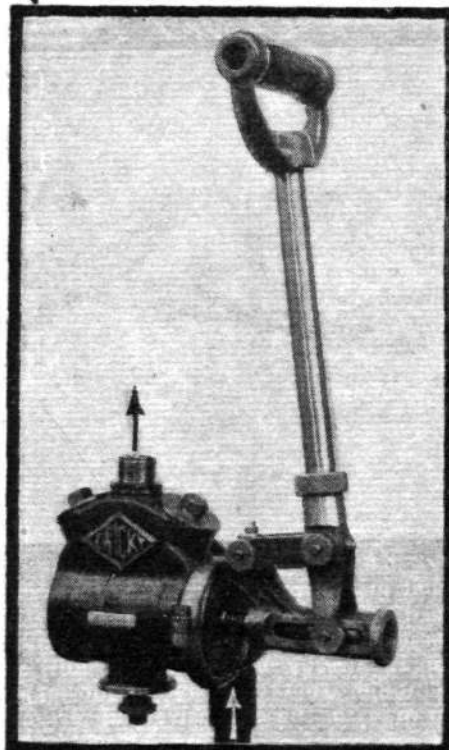
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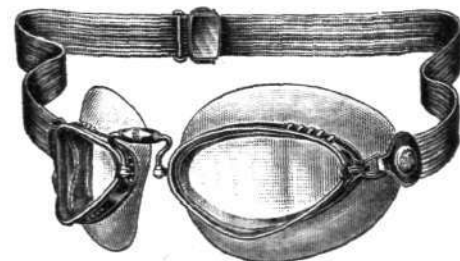
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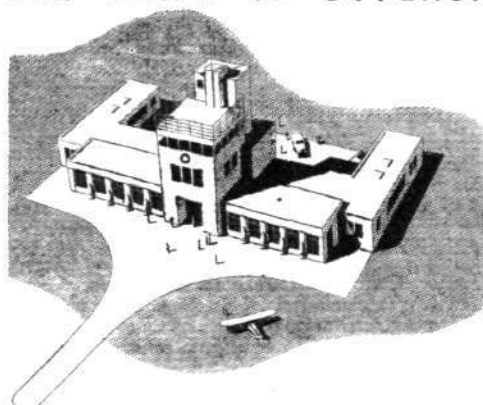
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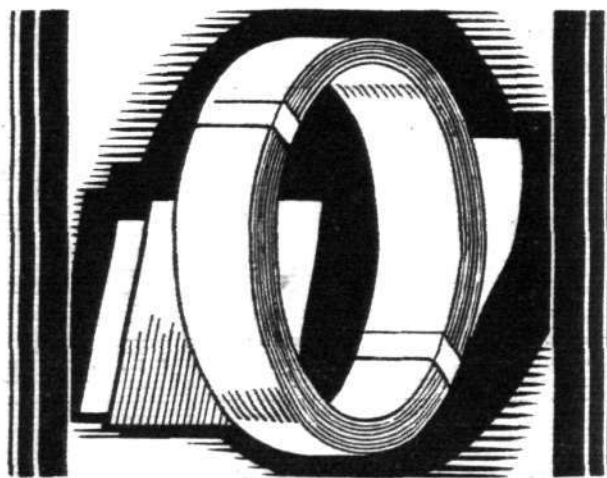
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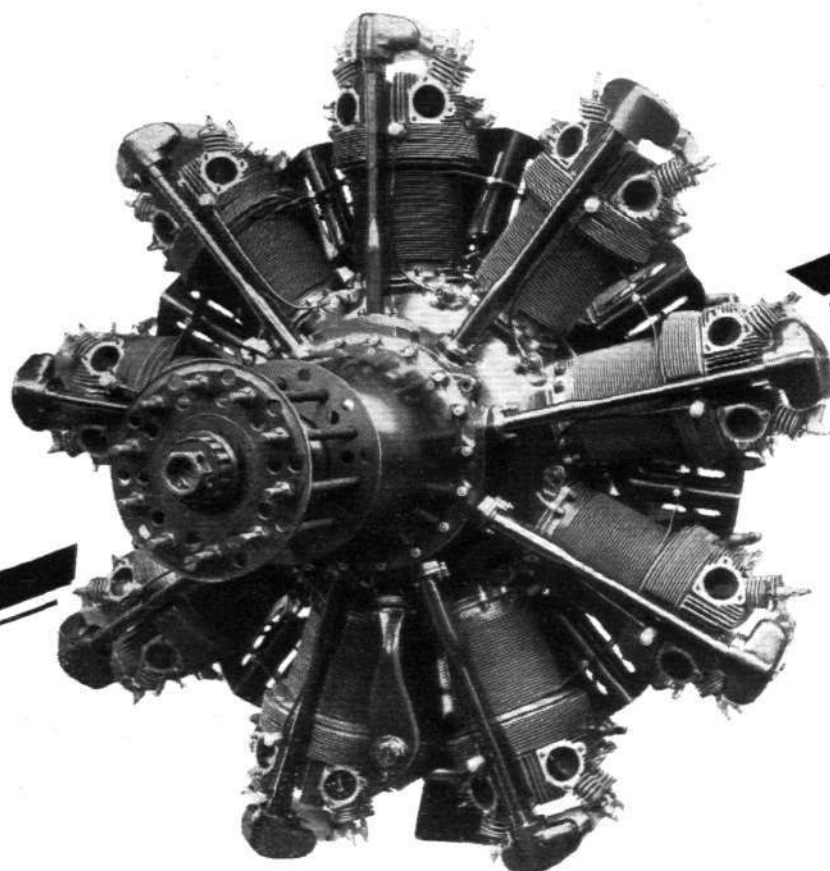
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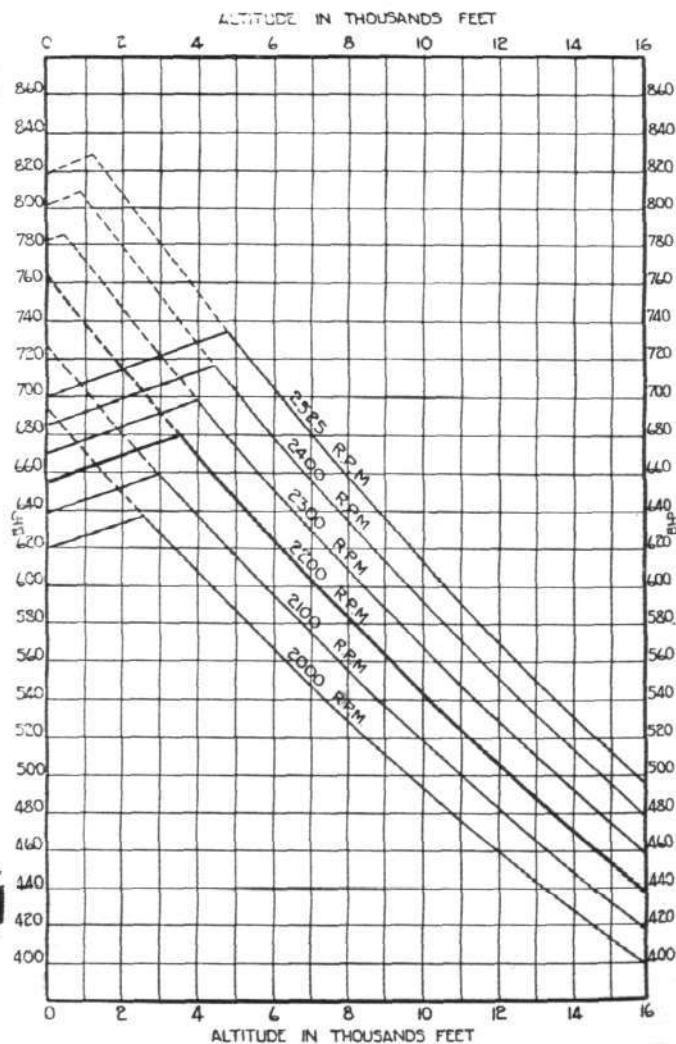
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Telegrams: "Aviation, Bristol."
Telephone: Bristol 45051.



PEGASUS III. POWER AT ALTITUDE.

STANDARD TEMPERATURE & PRESSURE CONDITIONS. FUEL 87 OCTANE.

--- POWER AVAILABLE FOR TAKE OFF AND CLIMB
— POWER AVAILABLE WHEN RATED BOOST IS NOT EXCEEDED